3. INITIAL EVALUATION OF WASTE AREA GROUPS 6 AND 10 SITES

This section presents the initial evaluation of WAGs 6 and 10 release sites, which includes the screening and risk assessment methodologies, contaminant inventories, potential exposure pathways, preliminary conceptual site models and remedial alternatives, and ARARs. As explained in the following sections, some sites received little or no hazardous or radioactive waste and some received large volumes. The sites with the potential to affect human health or the environment warrant scrutiny in the OU 10-04 comprehensive RI/FS. This section also evaluates WAGs 6 and 10 buildings for potential impacts on human health and the environment.

The purpose of this section is to focus the RI/FS on sites (or buildings) with environmental problems and to avoid inappropriate elimination of a site. Subsections 3.3 and 3.4 discuss the methodology by which the retained sites will be assessed for human health and ecological risk. A site may be retained for ecological assessment that was eliminated from the human health assessment. Note that the ecological assessment considers not only WAGs 6 and 10 sites, like the human health assessment, but also sites from all INEEL WAGs.

3.1 Background Information and Scope

The WAGs 6 and 10 sites include leach ponds, sanitary sewer systems, USTs, a blowdown sump, disposal pits, an injection well, a buried telecommunications cable, trash dumps, reactor burial sites, UXO, and contaminated soil areas. Wastes were disposed to these sites from reactor operations, office buildings, laboratories, storm and floor drains, ammunition activities, construction, leaking USTs, a utilities cable, and D&D activities. Site COPCs include asbestos, radionuclides, metals, VOCs, SVOCs, PCBs, UXO, high explosive residue, pesticides, and herbicides. In Section 1, Table 1-1 listed the WAGs 6 and 10 release sites, the FFA/CO investigations conducted, and the decisions resulting from the investigations. Background information for the initial human health evaluation listed in Table 1-1 is summarized in Appendix B.

One initial evaluation step that reduces the number of sites is a review of previous agency decisions based on human health risks. This review and a verification of continued validity are included below.

3.1.1 Review of Previous Agency Decisions for Human Health

During the OU 10-04 comprehensive RI/FS prescoping meetings DOE-ID, EPA, IDHW, and LMITCO reviewed information pertaining to each COCA (1987) summary assessment Track 1 and Track 2 investigation, removal or interim action, and RI/FS to determine which sites should be retained for further evaluation in the RI/FS. The human health sites retained for WAGs 6 and 10 based on this process are given in Table 1-1.

Appendix B is a screening based on human health of the WAGs 6 and 10 sites based on FFA/CO (DOE-ID 1991) decisions. The final site listing will be verified as defined in this subsection; however, Appendix B is retained because it compiles relevant data.

3.1.2 Verification of Agency Review of Previous Decisions

To verify that previous agency decisions are still valid, the sites will be reviewed during the OU 10-04 remedial investigation/baseline risk assessment (RI/BRA). The review process as depicted in Figure 3-1 will be based on the following:

- Potential cumulative impact based on COPCs
- Impact from potential ARARs
- New data or standards obtained since earlier decisions were made.

3.2 Waste Area Groups 6 and 10 Screening Process

This subsection summarizes the results of the human health and ecological screening. The screening process helps focus the OU 10-04 RI/FS on WAGs 6 and 10 release sites that can affect human health and the environment. Figure 3-2 illustrates human health and ecological site screening processes.

3.2.1 Human Health Screening Process

In the human health site screening process, two primary criteria are used to determine whether a release site is retained for further evaluation. A site is retained for further evaluation if (1) the site contains contamination that could produce unacceptable human health risk or (2) a data gap exists at the site. As shown in Figure 3-2, the following site screening steps were completed for the human health SDGA (Appendix B):

1. Compile contaminant sampling information for all WAGs 6 and 10 release sites
2. Evaluate sites that have not been evaluated by previous risk assessments (e.g., new sites)
3. Eliminate sites that were identified as "No Action" sites in the INEEL FFA/CO
4. Eliminate sites for which a known contamination source does not exist
5. Eliminate sites for which the risk was determined to be less than 1E-06 and the site hazard index (HI) was determined to be less than 1.0 because of previous risk evaluation activities (e.g., Track 1, Track 2, or other investigations)
6. Retain sites containing known contamination data gaps for further evaluation against the contaminant screening criteria.

These steps will be applied to determine which WAGs 6 and 10 sites will be further evaluated. The OU 10-04 RI/FS will include a summary of human health risks produced by potential exposures to contaminated ground water. The ground water contamination considered in this summary evaluation will not be included as part of the above site screening process.

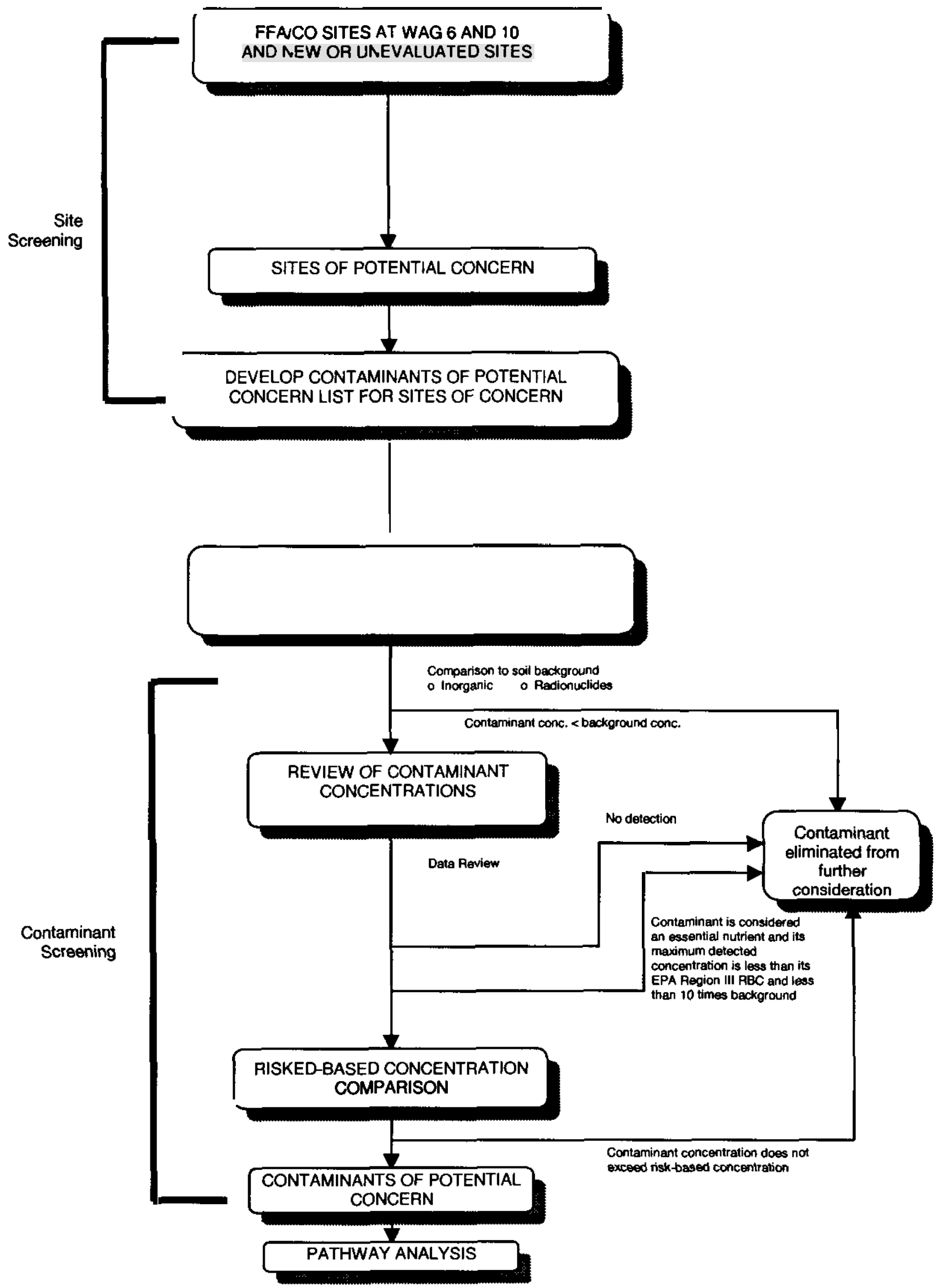

Figure 3-1. Screening review process.

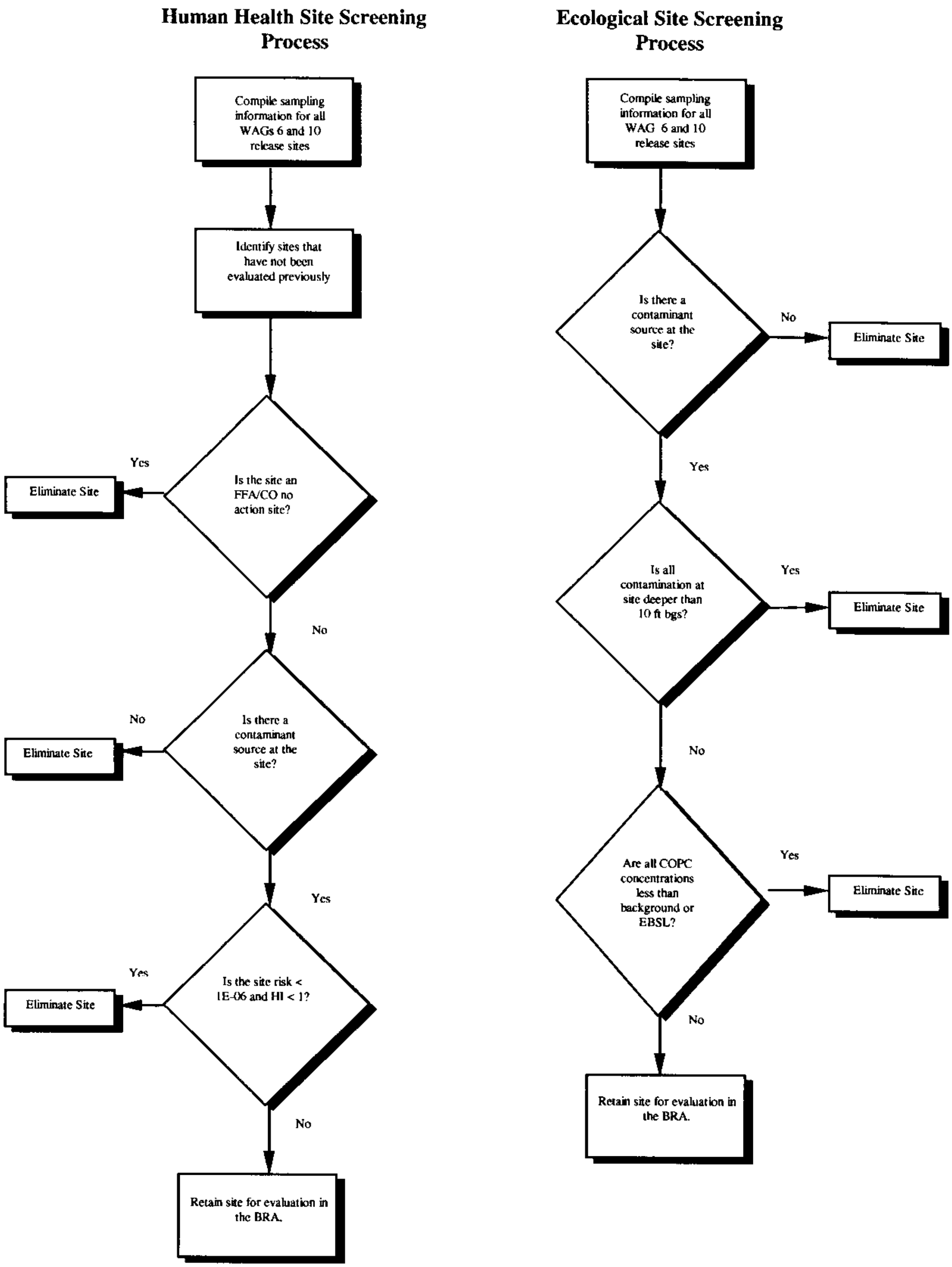

Figure 3-2. Human health and ecological site-screening processes.

The following subsections discuss each of the human health site screening steps.

3.2.1.1 Step 1—Compile Sampling Information for All WAGs 6 and 10 Release Sites. Information and data for WAGs 6 and 10 release sites provided the input for the SDGA site screening and data gap analysis. Table 1-1 provides a brief description of each of the release sites and the identified data gaps, and Appendix B includes a discussion of the data that was collected for each site.

3.2.1.2 Step 2—Identify Sites that Have Not Been Previously Evaluated. Sites that have not been previously evaluated are considered "unevaluated sites." Risks for these sites have not been calculated, so they are not considered under Step 5 of the site screening process.

3.2.1.3 Step 3 through 5—Elimination of No Action, No Source, and No Contamination Sites. In Step 3, sites designated as "No Action" in the FFA/CO action plan (DOE-ID 1991) were eliminated from further evaluation. The exception to this rule is associated with EBR-03 (the WMO-702 Seepage Pit) and EBR-04 (the WMO-701 Septic Tank). These sites were designated for No Action in the FFA/CO, but they were found to be contaminated with low levels of radionuclides by the D&D Program. As a result, they will be retained for further evaluation in the RI/BRA.

Sites for which no contamination has been detected, and sites from which contamination has been removed to an acceptable level by an interim action, were eliminated from further evaluation in Step 4. Likewise, sites that have been shown to have risks that are less than 1E-06 and HIs that are less than 1.0 were eliminated by Step 5. This screening step eliminated fewer than 10 release sites; therefore, the likelihood of the eliminated sites producing excessive cumulative risks is small. The impact of eliminating these sites will be considered in the uncertainty analysis of the OU 1-10 RI/BRA.

3.2.1.4 Step 6—Retain Site for Evaluation in the Baseline Risk Assessment. The last step of the site screening process was to identify the sites to be retained for further evaluation in the OU 10-04 contaminant screening process. These sites are identified in Table 1-1. The contaminant screening evaluation will be presented in the OU 10-04 RI/BRA. The evaluation is not presented in this work plan because more sampling data will be collected at some of the WAGs 6 and 10 release sites as part of the OU 10-04 RI/FS field investigations. Table 3-1 presents a summary of the known contaminant releases at the WAGs 6 and 10 sites retained for human health evaluation. These contaminants will be evaluated in the contaminant-screening portion of the OU 10-04 RI/BRA to identify the WAGs 6 and 10 soil pathway COPCs.

3.2.2 Ecological Screening Process

This subsection addresses the WAG-level screening process and discusses how the sites are compiled, evaluated, and screened again before beginning the OU 10-04 ERA. Appendix D1 presents the entire ecological approach from the WAG screening level ERA (SLERA) through the OU 10-04 ERA to the proposed long-term ecological monitoring program.

3.2.2.1 Waste Area Group Screening-Level Process. Initially, the SLERA was the first phase in the INEEL ERA process. A site-specific methodology has been developed and documented in the *Guidance for Conducting Screening-Level Ecological Risk Assessment at the INEL* (VanHorn et al. 1995). This guidance generally parallels the existing EPA guidance (EPA 1992a, 1995, 1997, 1998) and was developed to direct the performance of consistent and reproducible SLERAs for each of the INEEL WAGs. The general objectives of these SLERAs were to:

Table 3-1. Summary of COPCs for human health evaluation retained sites.

OU	Site	Description	COPC(s)	Contaminated Media
NA	EBR-I	EBR-I Reactor Building	Asbestos, metals, radionuclides	Building
None	EBR-03	EBR-I Seepage Pit	Radionuclides (Pu-238, Pu-239, Th-228, Th-230, Th-232, U-234, U-235, U-238)	Soil, potential ground water
None	EBR-04	EBR-I Septic Tank	Radionuclides (Pu-238, Pu-239, Th-228, Th-230, Th-232, U-234, U-235, U-238)	Tank contents (sludge)
6-01	BORAX-02	BORAX I Reactor Burial Site	Radionuclides (Cs-137, Co-60, U-235)	Surface soil, buried waste
6-02	BORAX-01	BORAX II–V Leach Pond	Radionuclides (Cs-137, Co-60, Pu-239/240, U-234, U-235, U-238)	Subsurface soil
6-02	BORAX-08	BORAX II–V Ditch	Radionuclides (Cs-137), metals	Subsurface soil
6-02	BORAX-09	BORAX II–V Reactor Building	Radionuclides (Cs-137, Sr-90)	Subsurface soil
6-02	EBR-08	EBR-I Fuel Oil Tank	Petroleum hydrocarbons	Subsurface soil
6-03	EBR-15	EBR-I Radionuclide-Contaminated Soil Area	Radionuclides (Cs-137)	Surface, subsurface soil along fence line
NA	STF	STF	Asbestos, metals, radionuclides, organics	Building
10-01	LCCDA-01	LCCDA Disposal Pit #1	Radionuclides (Cs-137, Co-60, U-234, U-235, U-238, Sr-90). Nitric acid, sulfuric acid, hydrochloric acid, ammonium citrate, waste oil, solvents, barium, beryllium, chromium, cyanide manganese, vanadium	Surface, subsurface soil, potential ground water
10-01	LCCDA-02	LCCDA Disposal Pit #2	Hydrochloric acid, sulfuric acid, ammonium hydroxide, beryllium, vanadium	Subsurface soil, potential ground water
10-02	OMRE-01	OMRE Leach Pond	Radionuclides (Cs-137, Sr-90, Co-60), organic decomposition products, SVOCs, VOCs, metals	Subsurface soils, potential ground water
10-03	ORD 1-29	Ordnance Areas	UXO, TPH, nitrate, nitrite, total phosphorus, picric acid, PCBs, pesticides, VOCs, and SVOCs	Subsurface, surface soil
10-04	STF-01	STF-601 Sumps and Pits	Asbestos, organics, metals, radionuclides	Surface water in sumps and pits, potential soil contamination beneath STF-601
10-04	STF-02	STF Gun Range	Metals, organics	Surface, subsurface soil
10-04		Aquifer	See Table 3-4	Ground water
10-05	None	Ordnance Interim Action	Same as for OU 10-03	Same as for OU 10-03
10-06	None	Radionuclide-Contaminated Soil Areas (BORAX-08, EBR-15, EBR-I Windblown Area, BORAX Windblown	Radionuclides (Cs-137, Sr-90, Co-60)	Surface, subsurface soil

- Identify and screen those contaminants with low potential for causing adverse effects to ecological receptors
- Identify and screen those sites that do not significantly contribute to risk
- Identify those sites for which additional data are needed for performing a WAG ERA.

Though preliminary assessments should be done as quickly and inexpensively as possible, these screenings should also give "higher priority to avoiding inappropriate elimination of an issue than to inappropriate inclusion of an issue" (Suter and Loar 1992). Consequently, SLERAs performed at the INEEL are based on conservative assumptions to ensure the potential for adverse ecological effects are not overlooked.

Waste Area Groups 6 and 10 sites were identified by the FFA/CO (DOE-ID 1991) and other sources and are summarized in Appendix C1. These sites were preliminarily screened as a concern for OU 10-04 ERA based on whether the site is uncontaminated (no source to the environment) or because the site is inaccessible to the ecosystem of concern (no pathway to ecological receptors). This screening is presented in Appendix C1. The list of WAGs 6 and 10 sites to be included in the ERA analysis (sites of concern) and COPCs are also compiled in Table 1-1. The next step in the ERA process is to perform the WAGs 6 and 10 sites ERA as discussed in Subsection 3.4.

3.2.3 Results and Data Gaps for Retained Sites in Waste Area Groups 6 and 10

Eleven WAGs 6 and 10 sites were retained for human health risk assessment to address data gaps. Data gaps were identified using Track 1 and Track 2 decision documents, RI/FS reports, interim action reports, removal action information, and D&D summary reports. Data and historical processes from the 11 retained sites (see Appendix B) were reviewed to determine if further sampling is needed.

The WAGs 6 and 10 sites retained for ERA are presented in Table C1-2 in Appendix C1 and Table 1-1. These sites will be assessed using data collected as part of the human health effort.

3.2.4 Other Waste Area Group Sites Included in the OU 10-04 Investigation

Two WAG 4 sites (CFA gravel pit and landfill) were evaluated during the 10-03 Track 2 investigation for ordnance. Documentation for these sites is contained in the *Preliminary Scoping Track 2 Summary Report for Operable Unit 10-03 Ordnance* (Sherwood et al. 1998). However, since these WAG 4 sites were determined to be "No Further Action" Sites, additional evaluation under OU 10-04 is not required.

3.2.5 Contaminant Inventory of Retained Sites

Table 3-2 lists the INEEL discharge locations that are significant sources of INEEL groundwater contamination. For each major discharge location the table lists years of use and volume discharged. For active sites, the discharge volume from 1982 to 1992 is estimated. The table does not list the source for the INTEC and the RWMC perched water areas because multiple discharges or contamination sources may have contributed to their development.

Table 3-2. Principal sources of potential ground water contamination at the INEEL.

Source of Potential Groundwater Contamination/COPC	Years of Operation	Estimate of Disposed Effluent Volume (L)
TAN—Organics, Radionuclides, Metals		
LOFT-02 Disposal Pond	1971–Present[a]	7.8E+08[b]
TSF-07 Disposal Pond	1972–Present[a]	6.3E+08[b]
TSF-05 Injection Well	1953–1972[c]	1.3E+05[c,d]
WRRTF-03 Evaporation Pond	1984–Present[a]	3.0E+08[b]
NRF—Radionuclides, Metals		
OU 8-07 Industrial Waste Ditch	1953-Present[l]	1.7 to 4.4E+10[l]
OU 8-08-12 & 14 S1W Leaching Bed/Pits	1953-1979[k]	1.2E+09[k]
OU 8-08-19 A1W Leaching Beds	1958-1972[k]	3.2E+08[k]
OU 8-03-23 NRF Sewage Lagoons	1960-Present[k]	2.2E+09[m]
TRA—Radionuclides, Metals		
TRA-06 Chemical Waste Pond	1962–Present[e]	2.9E+08[b]
TRA-08 Cold Waste Pond	1982–Present[e]	9.4E+09[b]
TRA-05 Disposal Well	1964–1982[e]	1.5E+10[e]
TRA-03 Warm Waste Pond (including the WWP retention basin)	1952–1993[e]	4.5E+09[f]
OU 2-12 Perched Water	NA[g]	NA[g]
INTEC—Radionuclides, Metals		
INTEC-304 Injection Well	1952–1989[h]	4.2E+10[h]
Perched Water	NA[g]	NA[g]
INTEC Tank Farm	1953-Present	1.5+06[j]
ANL-W—Radionuclides		
ANL-01 Industrial Waste Pond	1964–Present[b]	2.0E+09[b]
ANL-04 Sewage Treatment Ponds	1965–Present[b]	2.3E+08[b]
ANL-08 EBR-II Leach Pit	1959–1973[b]	3.5E+07[f]
RWMC—Radionuclides, Metals, Organics		
Perched Water Beneath the SDA	NA[g]	NA[g]
Organic Contamination in the Vadose Zone	1952–1970	5.9E+05[o]
CFA—Organics, Metals		
CFA-08 Drain Field	1953–Present[b]	1.6E+09[b]
PBF—Radionclides, Metals		
PBF-15 Warm Waste Injection Well	1969–1984[b]	3.4E+08[f]

Table 3-2. (continued).

Source of Potential Groundwater Contamination/COPC	Years of Operation	Estimate of Disposed Effluent Volume (L)

a. Information taken from the draft OU 1-10 Work Plan (LMITCO 1995b).

b. Estimated disposed volume from 1982-1992 (EG&G 1993).

c. Information taken from the OU 1-07B RI report (EG&G 1994).

d. Estimated volume of injected TCE wastes. Value taken from the OU 1-07B RI report (EG&G 1994).

e. Information taken from the OU 2-12 RI report (EG&G 1992).

f. Estimated from information presented in Table 3 of (EG&G 1993).

g. NA – Not Applicable.

h. Information taken from the OU 3-13 RI/BRA (LMITCO 1996).

i. Information taken from the draft OU 7-13/14 Work Plan (Huntley 1995). This information is not expected to change in the final work plan.

j. Estimated volume.

k. Information taken from the NRF Comprehensive RI/FS (WEC 1997).

l. Information taken from the OU 8-07 Final RI/FS (WEC 1994).

m. Based on a discharge rate of 1.5E+07 gallons per year to the Sewage Lagoon, estimated from the NRF Yearly Monitoring Reports; 1990 through 1996.

n. Information taken from the OU 7-08 Record of Decision (DOE-ID 1994)

o. Information taken from Miller and Navratil 1998.

Radionuclides and metals are the principal INEEL contaminants released to the SRPA. Oxygenated anions (e.g., sulfates, nitrates, and phosphates), salts, acids, and bases have also been discharged, but complexation, sorption, and neutralization reduce the threat to human health from these contaminants. This expectation is supported by the results of numerous risk assessments performed at the INEEL including the *Preliminary Scoping Risk Assessment for the Subsurface Disposal Area Pits, Trenches, and Soil Vaults* (Loehr et al. 1994), and the screening and data gap analyses for WAGs 1 and 2 (Attachment 1 to the draft OU 1-10 *Work Plan* [LMITCO 1995b], and Attachment 9 of the OU 2-13 *Work Plan* [Lientz 1995], respectively). The organic contamination injected by the Technical Service Facility (TSF)-05 injection well is one of the highest priority sources of ground water contamination beneath the INEEL, but TSF-05 and the Subsurface Disposal Area are the only major sources of organic ground water contamination that have been identified at the INEEL.

The INEEL ground water contaminants that receive the most attention are the radionuclide contamination discharged from the INTEC-304 injection well, the chromium contamination contained in perched water beneath TRA, and the trichloroethene (TCE) and tetrachloroethene (PCE) contamination discharged from the TSF-05 injection well. Additionally, carbon tetrachloride in groundwater at the RWMC has been detected above MCLs on several occasions. Individual WAGs are evaluating each of these contamination sources to determine if remedial action is necessary.

All sources of ground water contamination at the INEEL are being evaluated as part of remedial activities at one or more WAGs. It is anticipated that the only significant WAG 10 concerns will be where plumes from individual WAGs overlap, where modeling or monitoring are needed at an INEEL scale, and where studies are needed to satisfy cross-cutting data needs at several WAGs.

3.3 Waste Area Groups 6 and 10 Human Health Risk Assessment Methodology

This subsection discusses the assessment methodologies that will be used in the OU 10-04 BRA. These methodologies are meant to be consistent with the methods used in other INEEL comprehensive RI/FSs, while accounting for the unique aspects of the WAGs 6 and 10 sites. The focus of this subsection is on the methods that will be used to evaluate human health risks from just the WAGs 6 and 10 release sites. Information about evaluation of ecological risks and ground water risks from other INEEL WAGs is presented in other sections of this work plan.

3.3.1 Data Evaluation

All past field investigation data will be evaluated in the OU 10-04 RI/BRA. The evaluation will be logically organized so that relationships between site investigation results for each medium (ground water, perched water, soil, soil gas, and air) are apparent. A data summary will be prepared to describe the quantities and concentration of specific contaminants in the specific environmental media, and the potential transport mechanisms and the expected fate and transport of contaminants in air and ground water media will be modeled as appropriate. Finally, the data evaluation process will involve the reduction of data into maps, tables, graphs, and figures that will help summarize the nature and extent of contamination at the WAGs 6 and 10 release sites.

3.3.2 Exposure Assessment

The human health exposure assessment quantifies the receptor intake of COPCs for select pathways. The assessment consists of estimating the magnitude, frequency, duration, and exposure routes between the environment and human receptors who may come into contact with the contamination released at WAGs 6 and 10. The exposure routes that will be evaluated for the WAG 6 and 10 release sites are summarized in the PCSM presented in Figures 3-3, 3-4, and 3-5. The occupational scenario will be evaluated at the current time and 100 years in the future, and the residential and Native American scenarios will be evaluated at just 100 years in the future. Child exposures will be incorporated into the soil ingestion risk calculations for the residential and Native American scenarios since studies have shown that children can receive proportionately more exposure to contamination through soil ingestion than adults typically receive.

In general, the exposure routes shown in Figures 3-3, 3-4, and 3-5 are consistent with the INEEL *Track 2 Guidance (DOE, 1994. Track 2 Sites: Guidance for Assessing Low Probability Hazard Sites at the INEL*, DOE/ID-10389, Revision 6, January). There are three primary exceptions to this rule. First, the BRA will evaluate risks from the ingestion of contaminated homegrown produce and dermal exposure to contamination. These exposure routes are not covered by the INEEL Track 2 Guidance, but they will be evaluated in the BRA to be consistent with other WAG Comprehensive BRAs.

Second, the explosive potential of unexploded ordnance will also be qualitatively evaluated in the BRA. The Track 2 Guidance does not address risks from the explosive potential of unexploded ordnance, but the potential is included in the PCSM because it produces possible risks for workers and future residents. Risks from exposure to the chemical constituents contained in the unexploded ordnance will also be evaluated in accordance with the Track 2 Guidance. These chemical risks are captured

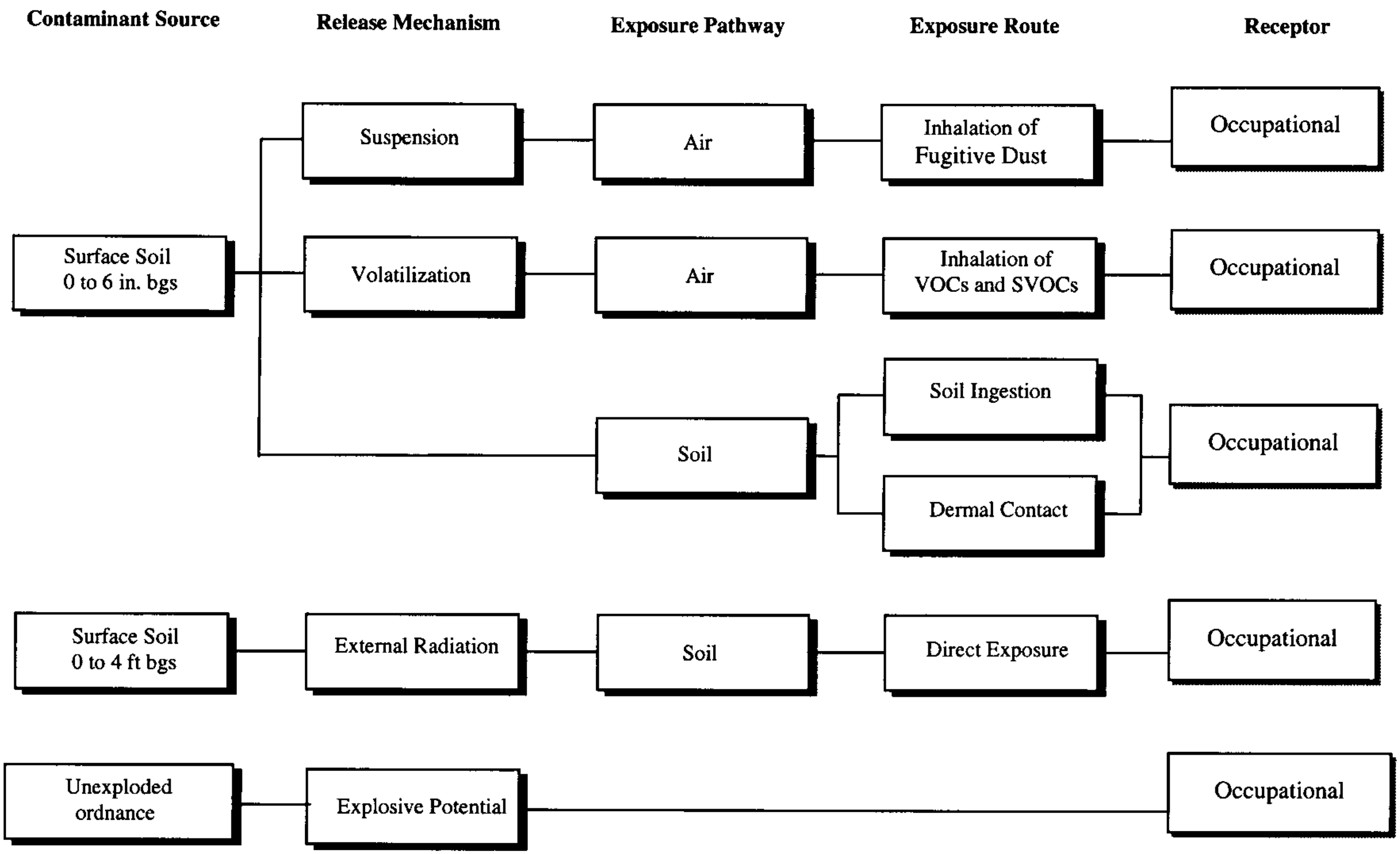

Figure 3-3. Occupational exposure scenario PCSM.

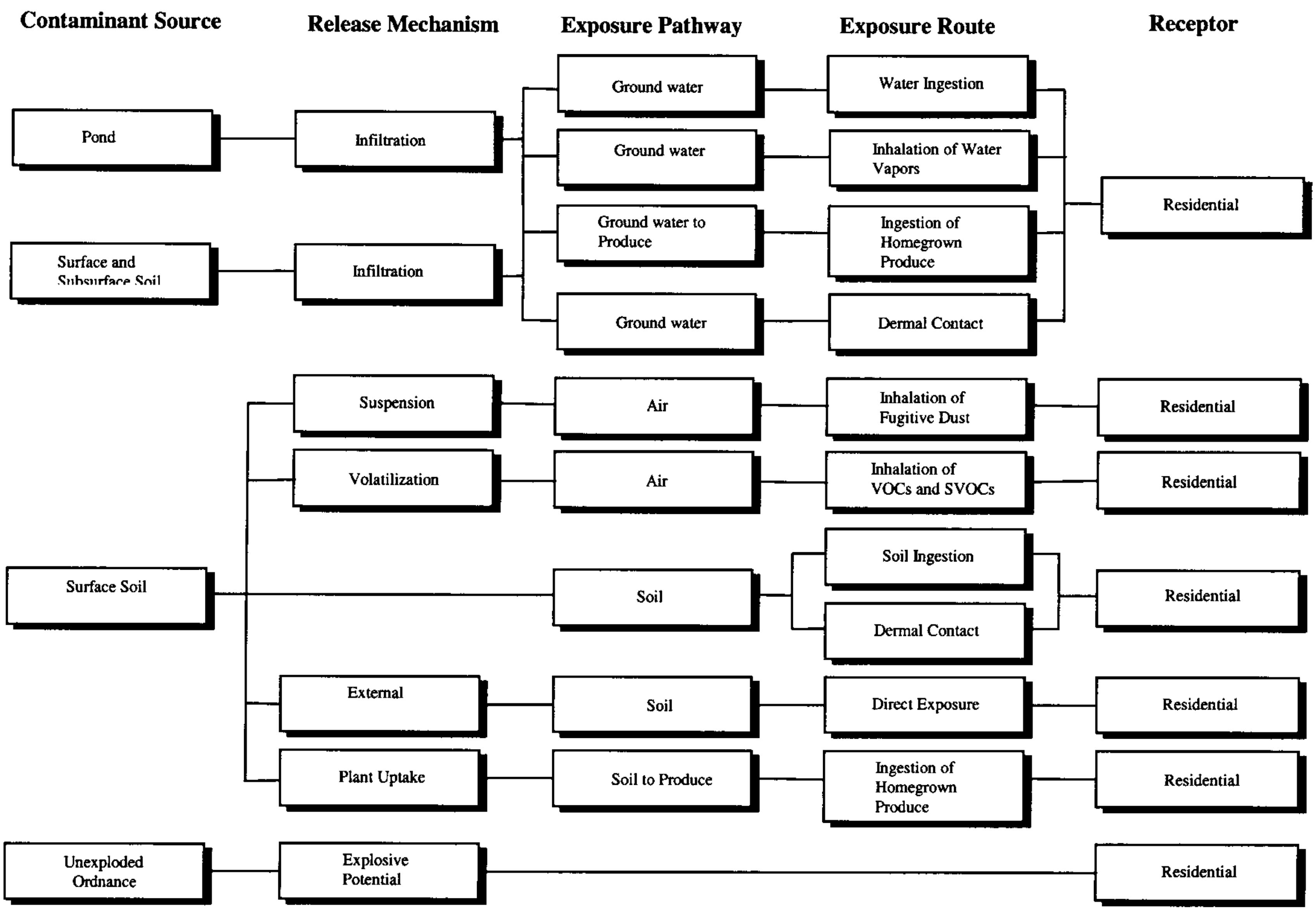

Figure 3-4. Residential exposure scenario PCSM.

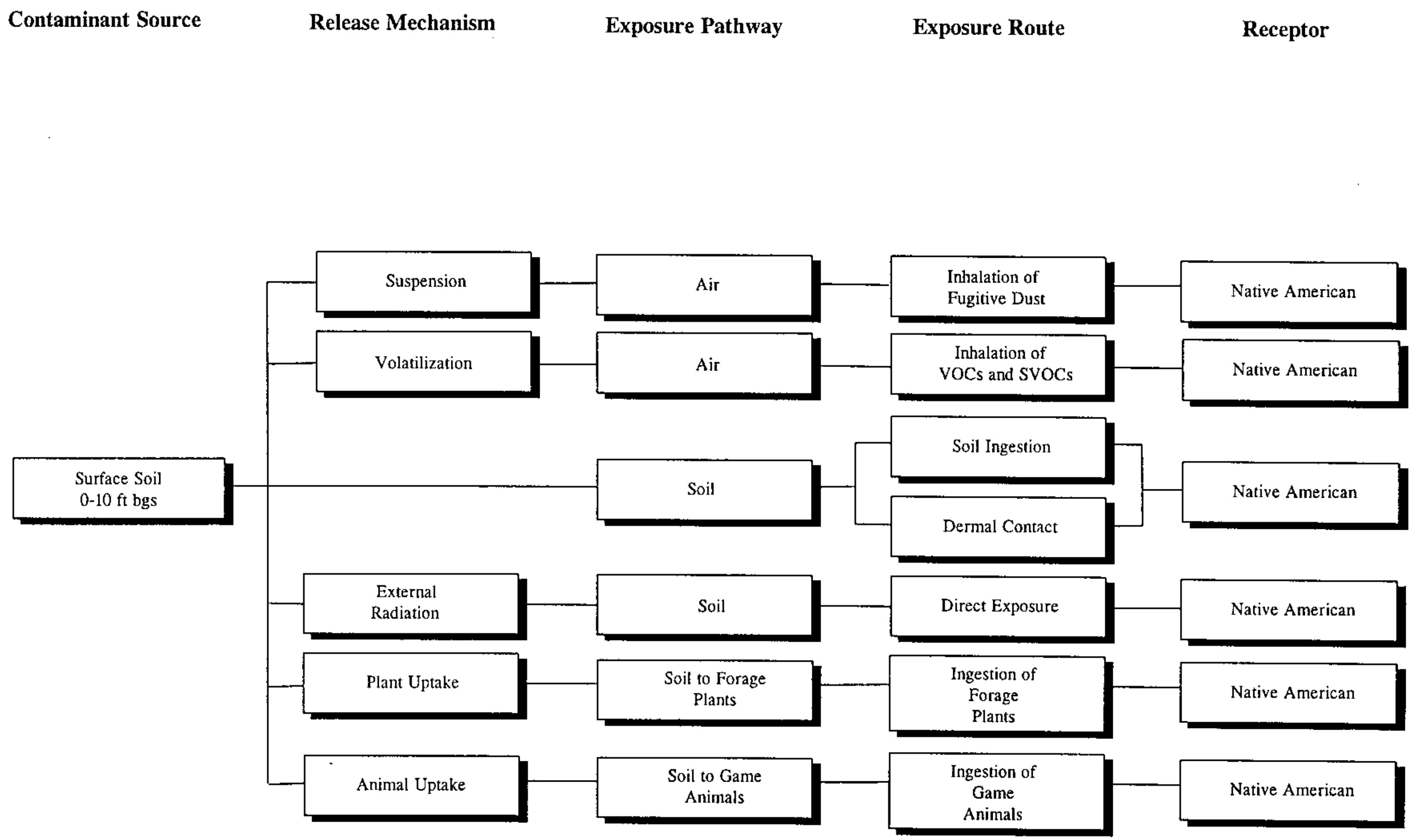

Figure 3-5. Native American PCSM.

in the PCSM under the "Surface Soil" contaminant source heading.

Third, a Native American exposure scenario will be included in the OU 10-04 BRA. This assessment will evaluate the exposure routes shown in Figure 3-5, and it will use exposure assumptions that will be developed during meetings with representatives from local Native American tribes.

Section 2.7 notes that ranchers, hunters, and occasional recreational receptors could become exposed to contamination at WAG 6 and 10 sites. Exposure scenarios have not been developed to directly evaluate risks to these groups because the residential and occupational scenarios will bound risks to receptors who will receive infrequent exposures. In other words, as long as remedial actions are taken to eliminate unacceptable risks to hypothetical residents and workers, risks to ranchers, hunters, and recreational receptors will also be eliminated.

To quantify receptor intakes, the following activities will be performed as part of the OU 10-04 BRA:

- Identification of contaminant sources
- Identification and characterization of exposed populations
- Evaluation of exposure pathways
    - Estimation of contaminant concentrations at points of exposure for the following exposure pathways
    - Ground water pathway
    - Air pathway
    - Soil pathway
    - UXO hazard
- Estimation of contaminant intakes.

3.3.3 Toxicity Assessment and Risk Characterization

The toxicity constants that will be used in the BRA will be obtained from several sources. The primary source of information will be EPA's Integrated Risk Information System (IRIS). The IRIS contains only those toxicity constants that have been verified by EPA's Reference Dose or Carcinogen Risk Assessment Verification Endeavor (CRAVE) work groups. The IRIS database is updated monthly and supersedes all other sources of toxicity information. If the necessary data are not available in IRIS, EPA's Health Effects Assessment Summary Tables (HEAST) (EPA 1994) will be used as the next most preferable information source. The HEAST contains a comprehensive listing of provisional risk assessment information that have been reviewed and accepted by individual EPA program offices, but have not had enough review to be recognized as high-quality, agency-wide information (EPA 1994).

3.3.3.1 Toxicity Assessment and Risk Characterization for Carcinogenic Contaminants. Potential carcinogenic risks will be expressed as an estimated probability that an individual might develop cancer from lifetime exposure. This probability is based on projected intakes and chemical-specific dose-response data called cancer slope factors (SFs). Cancer SFs and the estimated daily intake of a compound, averaged over a lifetime of exposure, will be used to estimate the incremental risk that an individual exposed to that compound may develop cancer. This estimate will be derived using Equation (3-1).

$$Risk = Intake \times SF \tag{3-1}$$

where

Risk	=	carcinogenic risk (unitless)
Intake	=	contaminant intake (mg/kg-day or pCi)
SF	=	slope factor ($[\text{mg/kg-day}]^{-1}$ or $[\text{pCi}]^{-1}$).

3.3.3.2 Toxicity Assessment and Risk Characterization for Noncarcinogenic Contaminants. Potential noncarcinogenic effects will be evaluated by comparing daily intakes with chronic reference doses (RfD) developed by EPA. A chronic RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of the daily exposure that can be incurred during a lifetime, without an appreciable risk of a noncancer effect being incurred in human populations, including sensitive subgroups (EPA 1989a). The RfD is based on the assumption that thresholds exist for noncarcinogenic toxic effects (e.g., liver or kidney damage). It is a benchmark dose operationally derived by the application of one or more order of magnitude uncertainty factors to doses thought to represent a lowest or no observed adverse effect level in humans. Thus, there should be no adverse effects associated with chronic daily intakes below the RfD value. Conversely, if chronic daily intakes exceed this threshold level, there is a potential that some adverse noncarcinogenic health effects might be observed in exposed individuals.

For risk characterization purposes, potential health effects of chronic exposure to noncarcinogenic compounds will be assessed by calculating a hazard quotient (HQ) for each COPC. Hazard Quotients will be derived by dividing the estimated daily intake by a chemical-specific RfD as shown in Equation (3-2).

$$HQ = Intake/RfD \tag{3-2}$$

where

HQ	=	hazard quotient (unitless)
RfD	=	reference dose (mg/kg-day)
Intake	=	contaminant intake (mg/kg-day).

A HQ greater than 1.0 will indicate that exposure to a given contaminant may cause adverse health effects in exposed populations. Hazard quotient values do not represent a probability or a percentage. For example, an HQ of 10 does not indicate that adverse health effects are 10 times more likely to occur than an HQ value of 1.0. All one can conclude is that HQ values greater than 1.0 indicate that noncarcinogenic health impacts are possible, and that the more a HQ value exceeds unity, the greater the concern about potential adverse health effects.

Hazard quotients will be summed across exposure routes to calculate a HI for each COPC. Individual pathway HI values will then be summed to determine a cumulative HI value for all exposure pathways and COPCs at each release site.

3.3.4 Uncertainty Analysis

The risk assessment results presented in the OU 10-04 BRA will be very dependent on the assessment methodologies used in the evaluation. However, health protective assumptions that tend to bound the upper limits of human health risks will be used throughout the evaluation, so risk estimates that might be calculated using other risk assessment methods probably would not be significantly greater than the results that will be presented in the BRA.

Each of the steps that will be taken to calculate risks in the BRA will have associated uncertainties. These uncertainties will affect the evaluation's final risk results, so the impacts of the uncertainties will have to be understood before the results are interpreted. The BRA will include a qualitative discussion of uncertainties that could be used for determining whether the results presented in the BRA could be under or over estimated.

3.4 Waste Area Groups 6 and 10 Ecological Risk Assessment Methodology

This subsection provides an overview of the methodology that will be used to evaluate the WAGs 6 and 10 sites for potential risk to ecological receptors. The ERA results for WAGs 6 and 10 sites will be summarized with the results of other WAG ERAs for use in the OU 10-04 ERA. The assessment will be consistent with the methods used for other WAG ERAs, while accounting for the unique aspects of the OU 10-04.

The general goals of the WAG ERA are to:

- Define contamination extent with respect to ecological receptors for each site within a WAG
- Determine the actual or potential effects of contaminants on wildlife (including T/E and other species of concern), habitats, or special environments at the WAG level
- Identify sites and COPCs to be carried to the OU 10-04 ERA
- Supply input to remedial action (RA) decisions at the WAG level.

3.4.1 Problem Formulation

The goal of the problem formulation of the ERA is to investigate the interactions between the stressor characteristics, the ecosystem potentially at risk, and the ecological effects (EPA 1992a). This process begins with a general description of the site and a characterization of the ecosystem at risk. Next, the potential stressors to the ecosystem are identified, the migration pathways of the identified stressors are modeled, and the potentially affected components of the ecosystem are identified. The ecosystem at risk and stressor characterization with exposure pathways are then assimilated into the conceptual site model. The problem formulation phase results in characterization of stressors (i.e., identification of contaminants), definition of the assessment endpoints, and ecological effects used to analyze risk using the conceptual site model.

3.4.2 Analysis

The analysis phase consists of (a) the ecological effects analysis and (b) the exposure assessment (characterization of exposure) (EPA 1992a). The purpose of the effects (or stressor-response) assessment is to characterize the toxicity of stressors to selected receptors. Effects of the contaminants on those functional groups/individual species identified as potential receptors are quantified as toxicity reference values (TRVs). The exposure assessment will incorporate the information gathered during the problem formulation phase (i.e., contaminant migration and pathways model and stressor characterization) to identify actual or potential exposure routes to ecological receptors and evaluate the magnitude of exposure to those receptors.

3.4.2.1 Exposure Assessment. The WAG ERA will rely on the human health data evaluation discussed in Subsection 3.3.1 to summarize the nature and extent of contamination at the WAGs 6 and 10 release sites.

The ecological receptor exposure assessment quantifies the receptor intake of COPCs for selected pathways. The assessment consists of estimating the magnitude, frequency, duration, and exposure routes between the environment and the ecological receptors that contact the contaminant releases at WAGs 6 and 10 sites. The pathways and associated exposure routes that will be evaluated for the WAGs 6 and 10 sites ERA are summarized in Figures 3-6 and 3-7. Note that currently no 6 and 10 sites have been identified as aquatic. Only exposure through ingestion of contaminated media are accounted for by the WAG ERA exposure models. Receptor exposures through dermal and inhalation routes for most COPCs are assumed to be negligible. No WAGs 6 and 10 sites have permanent surface water and the pathway will not be assessed in the ERAs.

To quantify receptor intakes, the following activities will be performed for the WAGs 6 and 10 site's ERA:

- Identification of contaminant sources (from human health risk assessment).

- Identification and characterization of exposed ecological receptors (see Table 3-3).

- Evaluation of exposure pathways (Figures 3-6 and 3-7). As shown, the abiotic and biotic media that will be investigated include:

  - Subsurface soil

  - Surface soil

  - Vegetation

  - Prey.

3.4.2.2 Ecological Effects. A summary of the effects of exposure to COPCs contained on the finalized list of contaminants to be evaluated at the WAGs 6 and 10 sites will be compiled from existing information from both the human health and ecological screenings and additional information from the literature. These summaries serve as a preliminary gathering of information for developing the TRVs necessary for the effects assessment. TRV development and evaluation is discussed in detail in Appendix D4. If no toxicity information is available for a contaminant, it is not possible to perform a

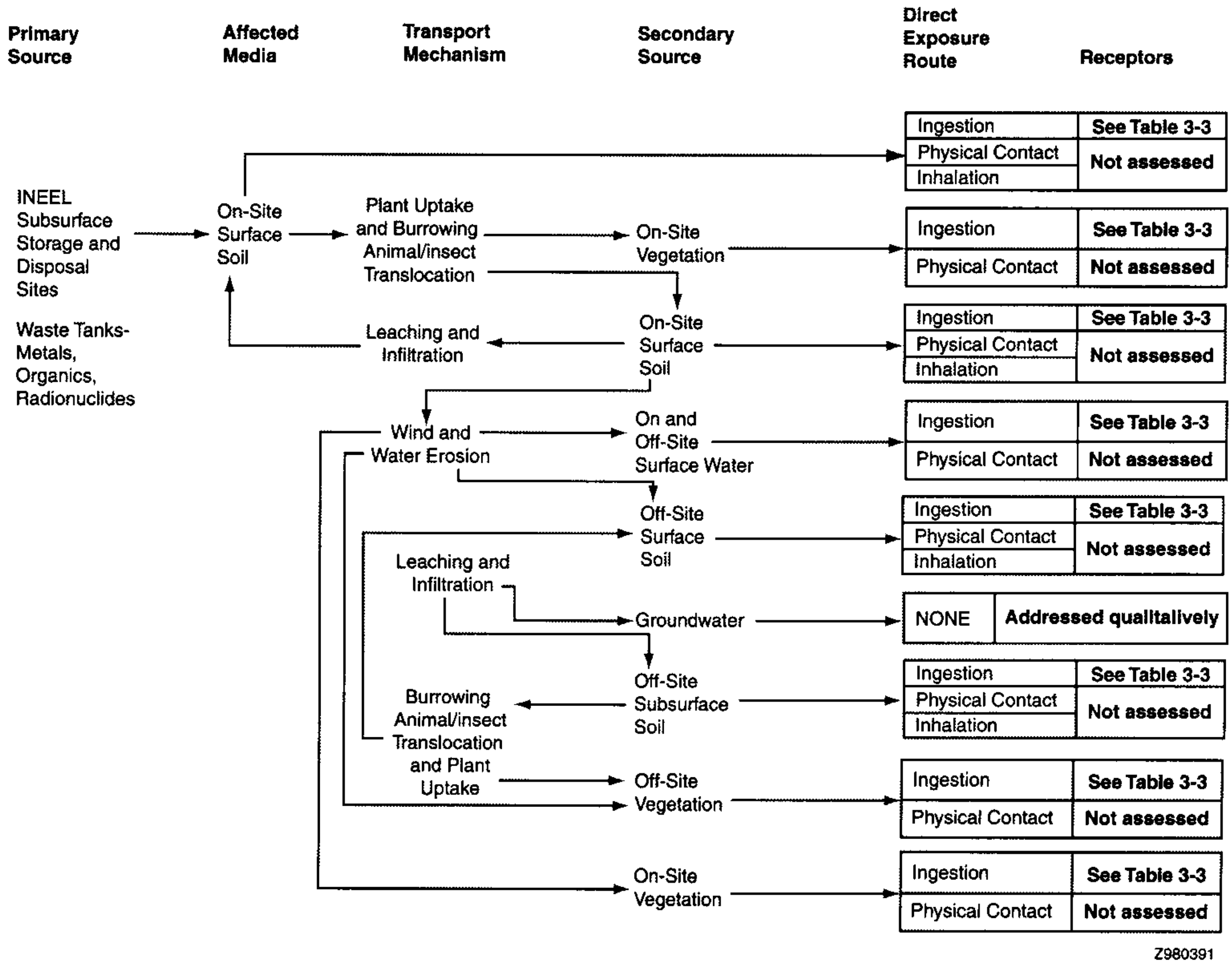

Figure 3-6. Ecological pathways/exposure model for subsurface storage.

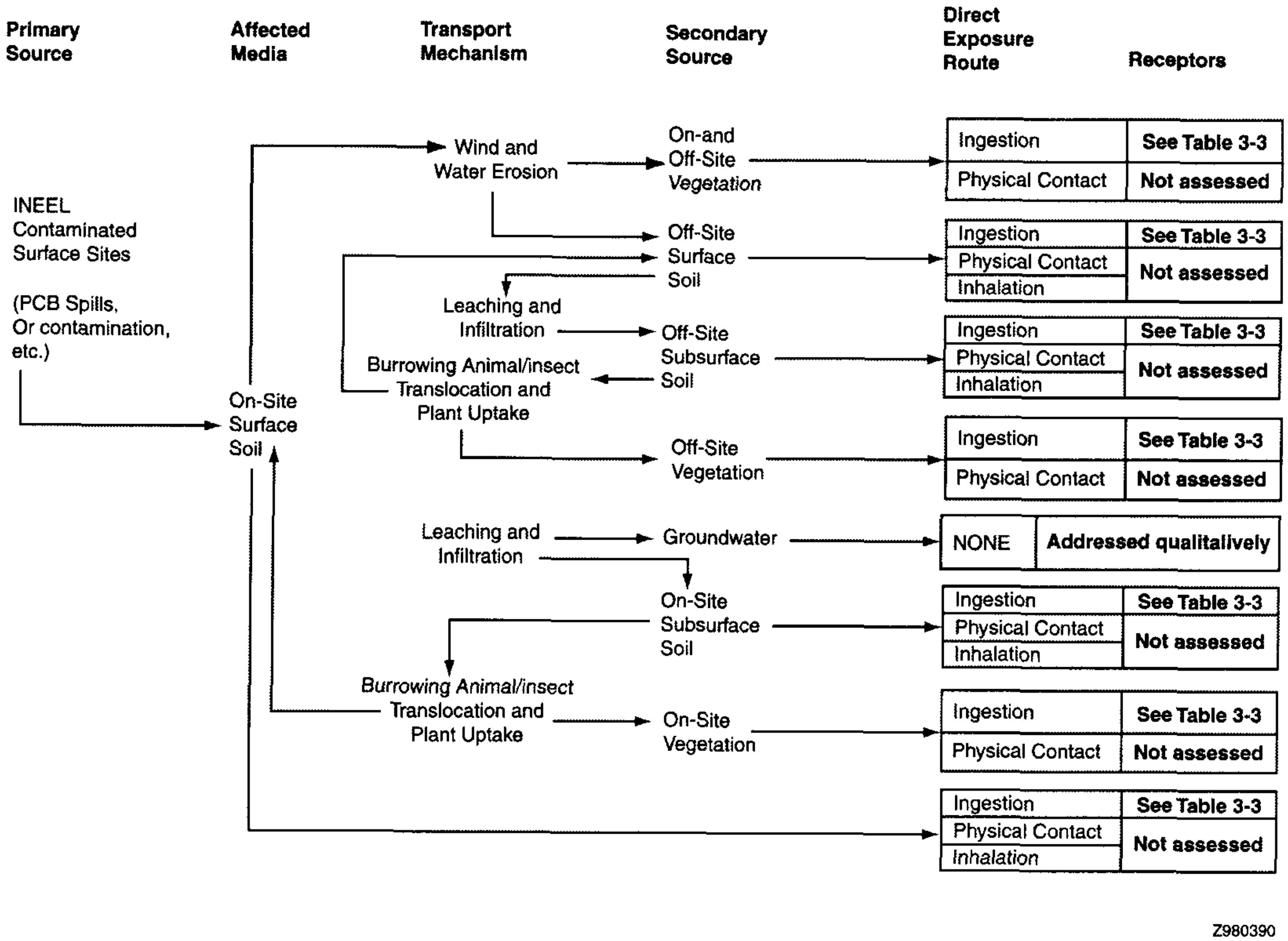

Figure 3-7. Ecological pathways/exposure model for surface contamination.

Table 3-3. Summary of pathways and direct exposure routes for INEEL functional groups.

Receptor	Exposure Media: Surface Soils	Subsurface Soils	Vegetation	Sediments	Prey[a]
Avian herbivores (AV122)	X		X		
Avian insectivores (AV210A)				X	X
Avian insectivores (AV222)	X				X
Avian insectivores (AV232)				X	X
Avian carnivores (AV310)	X				X
Northern goshawk	X				X
Peregrine falcon	X				X
Avian carnivores (AV322)					X
Bald eagle	X				X
Ferruginous hawk	X				X
Loggerhead shrike	X				X
Avian carnivores (AV322A)					
Burrowing owl	X	X			X
Avian omnivores (AV422)			X		X
Avian omnivores (AV442)			X		
Mammalian herbivores (M122)	X		X		
Mammalian herbivores (M122A)	X	X	X		
Pygmy rabbit	X	X	X		
Mammalian insectivores (M210A)	X				X
Townsend's western big-eared bat	X				X
Small-footed myotis	X				X
Long-eared myotis	X				X
Mammalian insectivores (M222)					
Merriam's shrew	X			X	X
Mammalian carnivore (M322)	X				X
Mammalian omnivores (M422)	X	X	X		X
Reptilian insectivores (R222)					
Sagebrush lizard	X				X
Reptilian carnivores (R322)	X				X
Plants					

a. Indirect exposure route

quantitative assessment of the effects to receptors. For those cases, a qualitative assessment will be made based on effects from similar contaminants and/or the contaminant will be included in the uncertainty analysis.

3.4.3 Risk Characterization

Risk characterization, which is the final step of risk assessment, involves evaluating the likelihood of adverse effects as a result of exposure to stressors (EPA 1992a). Risk characterization includes two major steps: (1) risk estimation and (2) risk description. In the risk estimation phase of the assessment, the results of the exposure and effects assessments are integrated to obtain an estimate of the level of effects that will result from the exposure. The results of the WAG 6 and 10 sites ERA will be presented as a range of HQs calculated for functional groups. The HQs will be summed by functional group and T/E (or C2) species to calculate the risk from multiple contaminants and/or pathways. A summed HQ greater than the target value (1.0 for nonradionuclides and 0.1 for radionuclides) implies a possible effect from multiple contaminants. Due to the uncertainty in the ERA methods, HQs are used only as an indicator of risk and should not be interpreted as a final indication of actual adverse effects to ecological receptors. In general, the significance of exceeding a target HQ value depends on the perceived "value" (ecological, social, or political) of the receptor, the nature of the endpoint measured, and the degree of uncertainty associated with the process as a whole. Therefore, the decision to take no further action, consider corrective action, or perform additional assessment should be approached on a site-, chemical-, and species-specific basis.

3.4.4 Uncertainty Assessment

The uncertainty assessment will include a qualitative discussion of the uncertainty associated with the ERA. This should provide the risk manager with an overall summary of the underlying assumptions and uncertainty in the risk assessment. Uncertainty is introduced into the assessment from any of the sources (see Table 3-4.)

3.5 OU 10-04 Ecological Risk Assessment

3.5.1 Approach

The INEEL has implemented a phased approach to ERA as shown in Figure 3-8. The operable unit system established by the FFA/CO framework and the phased approach similar to the human health Track 1 and 2 assessments has allowed a systematic progression to the performance of a large scale ERA (over 2,305 km^2 [890 mi^2]). This is considered an efficient and ecologically valid approach to identify actual or potential adverse effects to INEEL ecological receptors as a result of contaminant exposure.

The OU 10-04 ERA is the third phase of the approach and is designed to use the results of the WAG ERAs as primary input. As part of the OU 10-04 problem formulation, the WAG ERA information will be compiled and evaluated with the results of the other existing data and the 1997 field sampling. The results will be used to select key receptors, pathways, COPCs, and verify foodweb models for OU 10-04.

The specific objectives (EPA 1989b) of the OU 10-04 ERA are to:

- Define the extent of contamination with respect to ecological receptors on WAG 10 scale

Table 3-4. Sources and effects of uncertainties in the ecological risk assessment.

Uncertainty Factor	Effect of Uncertainty (Level of Magnitude)	Comment
Estimation of ingestion rates (soil, water, and food)	May overestimate or underestimate risk (moderate)	Few intake ingestion rate estimates used for terrestrial receptors are based on data in the scientific literature. Food ingestion rates are calculated by using allometric equations available in the literature (Nagy 1987). Soil ingestion values are generally taken from Beyer et al. (1994).
Estimation of bioaccumulation and plant uptake factors	May overestimate or underestimate risk and the magnitude of error cannot be quantified (high).	Few bioaccumulation factors (BAFs) or plant uptake factors (PUFs) are available in the literature because they must be both contaminant- and receptor-specific. In the absence of more specific information, PUFs and BAFs for metals and elements are obtained from Baes et al. (1984), and for organics from Travis and Arms (1988).
Estimation of toxicity reference values	May overestimate (high) or underestimate (moderate) risk	To compensate for potential uncertainties in the exposure assessment, various adjustment factors, as discussed in Appendix D4, are incorporated to extrapolate toxicity from the test organism to other species.
Use of functional grouping	May overestimate (moderate)	Functional groups were designed as an assessment tool that would ensure that the ERA would address all species potentially present at the facility. A hypothetical species is developed using input values to the exposure assessment that represent the greatest exposure of the combined functional group members.
Site use factor	May overestimate (high) or underestimate (low) risk	Site use factor is a percentage of the site of concern area compared to home range of the receptor species. Home range is not well documented for many species and may be highly variable. This can overestimate the risk at small sites.
Model uncertainties	May overestimate (unknown) or underestimate (unknown) risks	Assessment of model uncertainties is complicated and time consuming.

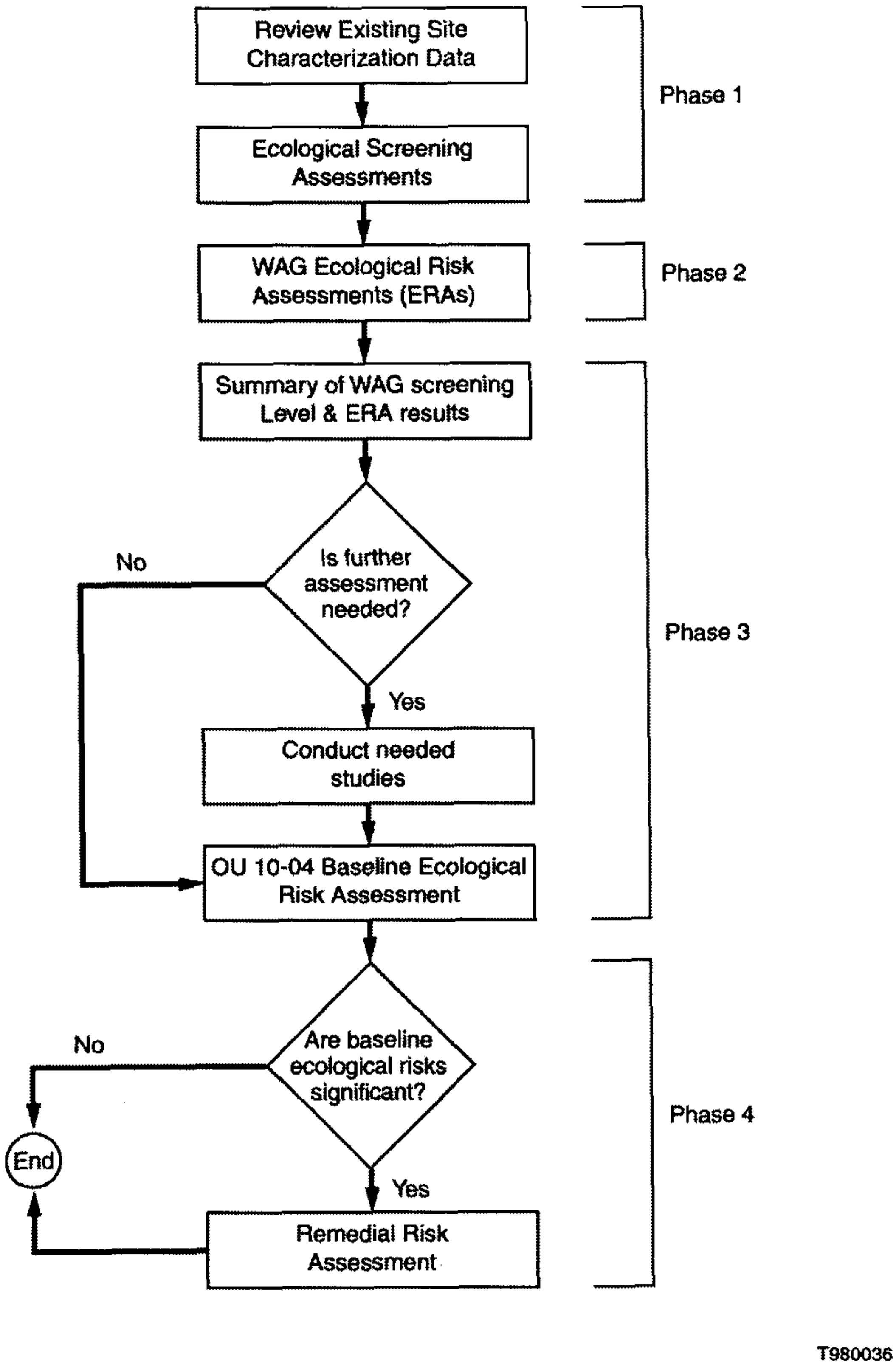

Figure 3-8. INEEL phased approach to ecological risk assessment.

- Determine and document the actual or potential effects of contaminants on wildlife, including T/E and other species of concern, habitats, or special environments

- Provide information for developing OU 10-04 remediation criteria

- Evaluate baseline information to define direction of subsequent monitoring for ecological concerns at the INEEL.

3.5.2 OU 10-04 ERA Data Gaps, Methodology and Documentation

Appendices C and D in this document support the OU 10-04 ERA effort.

Appendix C, which contains two parts Appendix C1 and Appendix C2. Appendix C1 presents the initial site screening for WAGs 6 and 10 sites for WAG ERA purposes. Appendix C2 presents the OU 10-04 data gap analysis. The purpose of Appendix C2 is to:

- Document the status of the data gaps identified in the *Approach and Data Gap identification for OU 10-04 INEL-wide Ecological Risk Assessment Technical Memorandum* (INEL 1996)

- Identify remaining and new data gaps that need to be addressed prior to the initiation of the OU 10-04 ERA

- Document the status of the WAG-specific ERA activities

- Review agency or stakeholders comments and concerns that must be addressed prior to initiation of the OU 10-04 ERA.

Appendix D summarizes the approach and methodology for performing the OU 10-04 ERA and summarizes a large amount of data used in previous phases of the INEEL ERA process. Appendix D is divided into four parts. Appendix D1 presents the INEEL phased approach and the OU 10-04 ERA methodology. Appendix D2, D3, and D4 summarize the methodology and parameters used in the performance of the WAG ERAs and SLERAs.

3.5.3 OU 10-04 Responsibilities

Although not the major emphasis of the OU 10-04 ERA, it is important to understand the disposition of individual WAG sites for ecological risk. This subsection discusses the ultimate designation of sites and how this fits into the OU 10-04 ERA. As shown in Figure 3-9, the individual WAG Comprehensive RI/FS should identify each of their sites as belonging in one of four categories including:

- No future action based on HH concern without ecological concerns

- No future action based on HH concern with ecological concerns

- Action based on HH concern without ecological concerns

- Action based on HH concern with ecological concerns

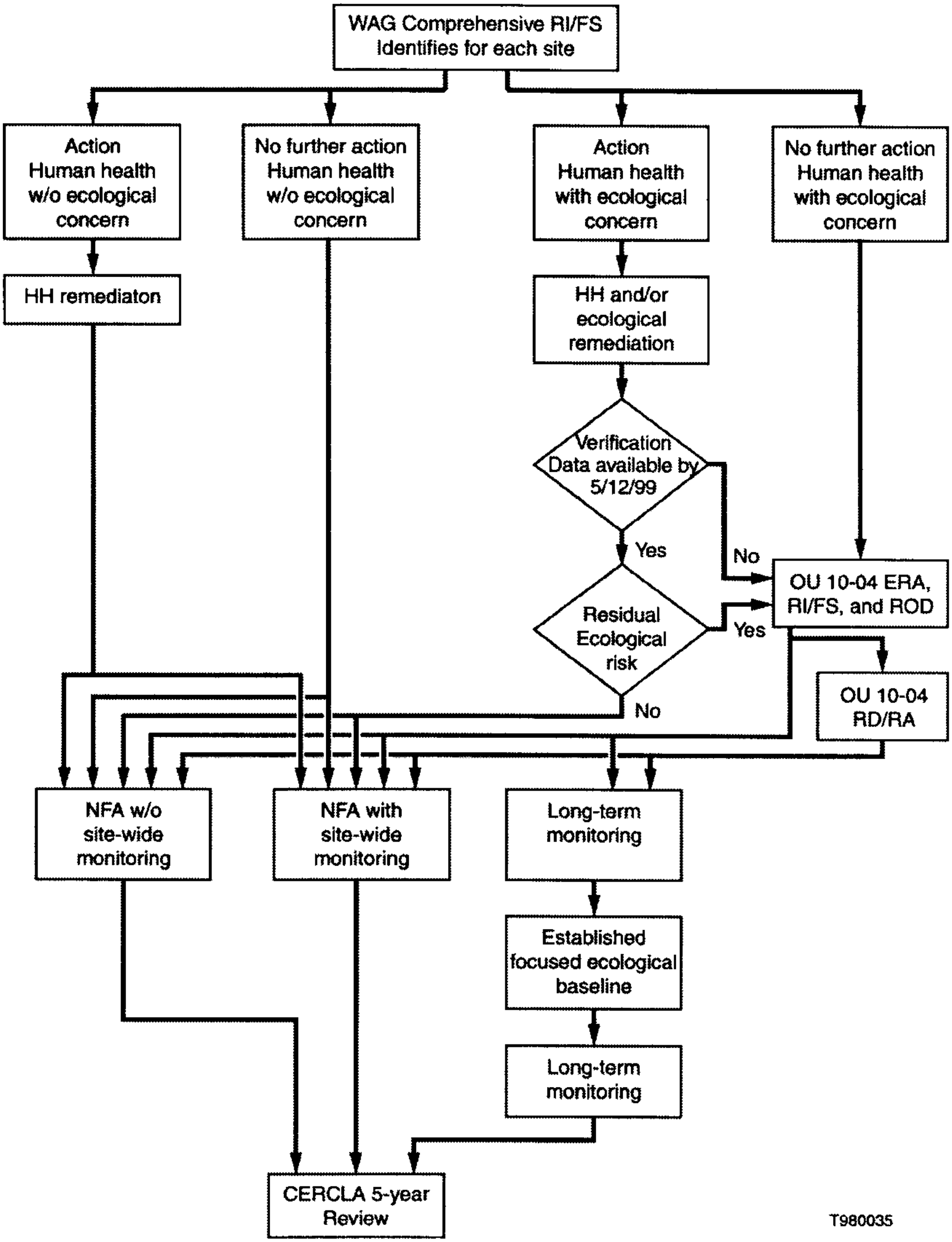

Figure 3-9. WAG site remediation path.

Those sites without ecological concerns as determined by the OU 10-04 ERA (either with or without a further action) after remediation for human health will ultimately be designated a no further action (NFA) site with or w/o site-wide monitoring. Future action refers to any remediation and/or additional characterization that may occur at the site. All decisions and actions at these sites will ultimately be revisited during post-remedial sampling and the CERCLA 5-year review.

Sites with ecological concerns will be dealt with as shown in Figure 3-9. If the site posed potential ecological concern at the WAG-level and was passed on to OU 10-04, then the site will be evaluated in the OU 10-04 ERA. Sites that are evaluated as part of the OU 10-04 ERA will either be remediated under the OU 10-04 RD/RA, be evaluated for long-term monitoring, or be designated as a NFA site with or w/o site-wide monitoring. All decisions and actions at these sites will ultimately be revisited during the CERCLA 5-year review.

3.6 Facilities Assessment Analysis

This subsection discusses the WAGs 6 and 10 facilities analysis completed as part of this work plan. Many facilities are proximal to the WAGs 6 and 10 FFA/CO sites. The analysis included reviewing all operational, abandoned, and demolished facilities for potential impact on cumulative WAGs 6 and 10 risk. Part of the facilities assessment included a review of management control procedures (MCPs) to verify their adequacy in preventing or controlling releases. The RCRA contingency plans, spill avoidance and response plans, emergency plan implementing procedures, and nuclear materials inspection and storage procedures also provide controls. Supporting these controls is a series of standard operating procedures (SOPs), which were also reviewed. The information from this analysis will be used in the comprehensive OU 10-04 RI/FS, to ensure that facilities with the potential to affect cumulative risk are retained for evaluation.

3.6.1 Operational Background

The WAGs 6 and 10 buildings and structures were built in the late 1940s through the early 1960s to conduct reactor experiments. Since 1970, the major program at these facilities has been D&D. Historical details of buildings and structures in WAGs 6 and 10 are reported *in Comprehensive Facility Land Use Plan* (DOE-ID 1996).

The only structures remaining at WAG 6 are the EBR-601 reactor building and annex, the EBR-602 security control house, the EBR-601 septic tank and seepage pit, and the two ANP jet engines displayed outside the EBR-I perimeter fence. The only structures at WAG 10 planned for evaluation under the OU 10-04 RI/FS are structures that were part of the former EOCR, now STF. Former EOCR structures remaining are the STF-601 main facility, STF-605 deep well pumphouse, STF-607 deluge valvehouse, STF-610 fuel element flow test facility, STF-611 pumphouse, and STF-612 shooting house. These structures are described in more detail in Table 3-5.

3.6.2 WAGs 6 and 10 Facilities Screening Process

The WAGs 6 and 10 facilities screening process included operational facilities, facilities no longer being used for their original mission, and abandoned or demolished facilities. The *Comprehensive Facility Land Use Plan* (DOE-ID 1996) was used to identify all buildings and structures in WAGs 6 and 10. The screening process determined whether a non-FFA/CO identified release had either occurred or could occur from these facilities. Facilities eliminated in this screening process will not be further evaluated in the RI/FS, and retained facilities will be further evaluated in the RI/FS. The eliminated sites

Table 3-5. WAGs 6 and 10 facility assessment sites.

Building or Structure No.	OU	Site No.	Description
WAG 6			
EBR-601/-601A	NA	EBR I	EBR-I Reactor building and annex built in 1953, Visitor Center, and offices for Registered National Historic Landmark. Three-story, 23,700-ft^2, high-density concrete structure in good condition. Occupied summer months only. Utilities: power, water, sanitary, sewer, phone.
EBR-602	NA	EBR I	EBR I Security Control House. A one-story, 254-ft^2 wooden frame structure built in 1953. Serves as entryway for EBR I; occupied intermittently. Utility: power only.
EBR-709/713	NA	EBR I	Septic tank and seepage pit that service EBR-601 during summer months.
HTRE-2/3	NA	EBR I	Heat transfer reactor test (HTRE) assemblies. Nuclear aircraft engines adjacent to and part of EBR Registered National Historic Landmark.
WAG 10			
STF-601	NA	STF	Security Training Facility (formerly EOCR facility). Three-story, 16,275-ft^2 reinforced structure built in 1962, fair condition. Concrete walls; high-bay is corrugated metal (65 ft height). Utilities: power, water, drains, fire sprinkler. Inside and outside sumps and pits contain water.
STF-605	NA	STF	STF deep well pumphouse built in 1962. One-story, 108-ft^2 vacant structure in poor condition; sheet metal siding and roof. One deep well pump in place, but not functional.
STF-607	NA	STF	STF deluge valvehouse built in 1962. One story, 44-ft^2 structure with hollow core block walls, metal roof in poor condition. Vacant; valves for fire protection.
STF-610	NA	STF	Fuel element flow test facility built in 1962. One-story, 904-ft^2 steel frame with metal panel walls, corrugated sheet metal siding and roofing, poor condition. Vacant.
STF-611	NA	STF	STF pumphouse built in 1962. One story, 135-ft^2 corrugated metal walls and 224-ft^2 roof. Drinking water supply for STF-601. One portable submersible pump, two pressure tanks, approximately 55-gal each. Utilities: power, space heater.
STF-612	NA	STF	STF shooting house. A 1,271-ft^2 structure located inside perimeter soil berm. Used by INEEL security for target shooting.

may be subject to performance standards that take effect under the OU 10-04 ROD. The performance standards ensure the sites will not pose an unacceptable cumulative risk following closure.

The results of the facilities screening are presented in Table 3-5. The screening criteria are discussed below.

A facility was eliminated from further consideration as a Facility Assessment Site if one or more of the following criteria was met:

1. The site was an existing OU in the FFA/CO (DOE-ID 1991), excluding sites designated as "No Action" sites in the FFA/CO

2. Discharges to the environment were evaluated and approved through other programs (e.g., by Wastewater Land Application Permit).

3. The building or structure was not used to process or store radioactive or hazardous materials or waste (e.g., personnel offices, nonhazardous material storage areas, and facility maintenance shops).

4. The building or structure had no history that would indicate a potential for releases or discharges.

3.6.3 Summary of Facilities Assessment Analysis

The results of the screening process indicate that the following facilities will be retained for evaluation in the OU 10-04 RI/FS to evaluate the potential impact of their demolition on cumulative risk:

- EBR-I Reactor Facility (EBR-601/601A) and area structures

- Security Training Facility.

The EBR-I facility is retained because it has a history of releases and the STF is retained because there is evidence that potentially contaminated water from STF-01 Sumps and Pits (a newly identified site) has been released to underlying soil. Both the EBR-I facility and the STF will undergo D&D in the future and are retained in the OU 10-04 RI/FS to evaluate their potential impact on WAGs 6 and 10 cumulative risk.

Facilities that were screened out, listed by building number and name, include:

- B8-601 Lincoln Blvd—Generator Building

- B8-602 Lincoln Blvd—Guardhouse

- B16-603—Experimental Field Station Storage Building

- B16-604—Experimental Field Station Pumphouse

- B16-605—Grid No. 3 Equipment Building

- B16-606—Experimental Field Station Storage Building
- B23-602—ANL-W Taylor Generator Building
- B27-601—Main Gate Generator Building
- B27-602—Main Gate East Portland Guardhouse
- B27-603—Main Gate Security Badging Facility
- B27-604—Main Gate East Portland Bus Passenger Shelter
- B27-605—Main Gate Deep Well Pumphouse
- HPTF-601—Howe Peak Equipment Building
- HPTF-602—Howe Peak Transformer Building
- HPTF-603—Howe Peak Repeater Station.

All these buildings were screened out in criterion 3 and 4 in Subsection 3.6.2.

3.7 Preliminary Remedial Action Objectives and Alternatives

This subsection discusses preliminary remedial action objectives (RAOs) and preliminary remedial action alternatives. The RAOs and remedial action alternatives are not fully developed until the OU 10-04 RI/FS is complete.

3.7.1 Preliminary Remedial Action Objectives

RAOs are contaminant and media specific goals for protecting human health and the environment, which will be based both on ARARs and on the results of the OU 10-04 RI/FS human health and ecological risk assessments. The WAGs 6 and 10 RAOs will focus on achieving specific contaminant concentrations and/or eliminating contaminant migration pathways. The preliminary suggested RAOs for contaminated WAGs 6 and 10 sites follow.

To protect human health in the future:

- Prevent exposure to radioactive materials with excess cancer risk levels greater than 1E-04 and to noncarcinogenic COCs with HQs greater than 1
- Prevent ingestion of contaminated soils and food crops with a total excess cancer risk level of greater than 1E-04 and to noncarcinogenic COCs with HQs greater than 1
- Prevent ingestion of ground water with contaminant concentrations exceeding MCLs or risk-based concentrations

- Prevent inhalation of suspended radioactive materials posing excess cancer risk levels greater than 1E-04 and to noncarcinogenic COCs with HQs greater than 1.

To protect the environment:

- Mitigate adverse effects to receptor species (as determined by the ERA) from soil, surface water, and air containing COCs.

- Mitigate erosion that may result in the release of contaminated soil or the exposure of buried contaminants

- Limit biotic intrusion in contaminated soils that could facilitate erosion or the release of contaminated soil.

3.7.2 Preliminary Remedial Action Alternatives

Preliminary remedial action alternatives are based on site conditions, experience, engineering judgment, and NCP guidelines (40 CFR 300). A remedial action alternative should be protective of human health and the environment. The overall objective of an alternative is to minimize the risk from WAGs 6 and 10 contaminants. Most WAGs 6 and 10 remedial action alternatives, including the "No Action" alternative, can and will include ground water monitoring. Preliminary WAGs 6 and 10 remedial action alternatives include the following:

- ***No Action with Ground water and/or Ecological Monitoring***—Monitoring is used to detect potential future releases to the SRPA, and/or verify decisions are protective of receptors.

- ***Access Restriction***—Intended to prevent or reduce exposure to onsite contamination. This may be accomplished through fencing, and through deed restrictions, which notify any potential purchaser of the risks.

- ***Containment***—Refers to technologies that isolate contaminants and mitigate offsite migration through engineering controls. A cover or cap consisting of a native soil cover, single barrier (i.e., clay), or composite barrier (i.e., clay plus flexible membrane liner) may be considered. This alternative could also include encapsulation or grouting of contaminated areas.

- ***Hotspot Removal***—Removal of contaminated soils in discrete WAGs 6 and 10 locations that pose a potential threat to human health or to the environment.

- ***Surface Controls***—Surface control technologies are designed to control and direct site runoff and prevent offsite surface water from running onto the site. Examples of surface control technologies include grading and vegetation.

- ***Leachate Collection, Monitoring, and Treatment***—Leachate collection is used to minimize or eliminate the migration of leachate to ground water.

- ***Ground water Pumping and Treatment***—Ground water is pumped to the surface for treatment and returned to the aquifer.

3.8 Identification of Potentially Applicable or Relevant and Appropriate Requirements

This subsection initially identifies ARARs for WAGs 6 and 10. The list represents a preliminary identification of ARARs based on site characteristics and contaminants at the site. Further identification and definition of ARARs will be completed as remedial action alternatives are identified and then presented in the RI/FS, the proposed plan, and the ROD.

The CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 (42 USC § 9601 et seq.), requires the selection of remedial actions that satisfy two threshold criteria: (1) overall protection of human health and the environment, and (2) compliance with ARARs. Remedies must address substantive standards, requirements, criteria, or limitations under any federal environmental law and any promulgated state environmental requirements, standards, criteria, or limitations that are more stringent than the corresponding federal standards. In addition, the importance of nonpromulgated criteria or other advisory information to be considered is formally recognized in the NCP in the development of remediation goals or cleanup levels. This information is labeled to-be-considered (TBC) criteria.

The EPA has specified that potential ARARs identified for a site should be considered at the points in the remediation planning process (52 FR 32496). These points include the following:

- During scoping of the RI/FS, chemical- and location-specific ARARs are identified on a preliminary basis.

- During the site characterization phase of the RI, when the baseline public health evaluation is conducted to assess risk at a given site, chemical-specific ARARs and TBC criteria are identified more comprehensively and are used to help identify preliminary RAOs.

- During the feasibility study (FS), location-and action-specific ARARs are identified under each alternative evaluated in the detailed analysis of alternatives. Changes in regulatory requirements can be assessed through the development of the ROD.

The ARARs identification process for the WAGs 6 and 10 comprehensive investigation consists of the following steps:

- Sites with previously identified ARARs are subject to those same ARARs.

- Sites without previously identified ARARs, or sites not previously evaluated, are evaluated against a draft ARAR table prepared for the INEEL (Ecology and Environment 1994) and the *CERCLA Compliance with Other Laws Manual* (EPA 1988) to identify preliminary chemical- and location-specific ARARs. Generally, action-specific ARARs are identified in the FS as appropriate for the remedial alternatives under consideration. However, action-specific ARARs that contain generic requirements deemed appropriate for most WAGs 6 and 10 remedial scenarios, are identified in Subsection 3.8.1.

3.8.1 Preliminary ARARs Identification

Subsections 3.8.1.1 through 3.8.1.3 discuss the preliminary list of ARARs that may apply to WAGs 6 and 10. Subsection 3.8.2 presents a preliminary listing of TBC criteria that may apply to remedial actions under WAGs 6 and 10. Table 3-6 presents a preliminary list of potential ARARs that are discussed in Subsections 3.8.1.1 through 3.8.1.3.

3.8.1.1 Action-Specific ARARs. Action-specific ARARs are technology- or activity-based requirements for actions taken at a site. Action-specific ARARs generally do not guide the development of remedial action alternatives, but rather indicate how the selected remedy must be implemented. Action-specifies ARARs will be identified following alternative development in the FS.

3.8.1.2 Chemical-Specific ARARs. Chemical-specific ARARs are usually health- or risk-based values that establish the acceptable amounts or concentrations of a chemical that may be found in, or discharged to, the ambient environment.

The screening and detailed analysis of remedial action alternatives must consider effectiveness, implementability, and cost when using chemical-specific ARARs in the FS. Chemical-specific ARARs assume significance during evaluation of the effectiveness of each remedial action alternative to protect human health and the environment.

The ability to protect human health and the environment is a threshold criterion that CERCLA remedial actions must meet (EPA 1990) to be considered a preferred remedy. The EPA considers a remedy protective if it adequately eliminates, reduces, or controls all current and future risks posed through each (exposure) pathway at the site. In accomplishing protectiveness, a remediation alternative must meet or exceed ARARs or other risk-based levels established when ARARs do not exist or are waived.

In both the NCP and the *CERCLA Compliance with Other Laws Manual* (EPA 1988), the EPA specifies that when ARARs are not available for a given chemical, or when such chemical-specific ARARS are not sufficient to be protective, risk-based levels should be identified or developed to ensure that a remedy is protective. Both carcinogenic and noncarcinogenic effects are considered in determining risk-based levels and evaluating protectiveness. For carcinogenic effects, the health advisory or risk-based levels are selected to ensure that the total lifetime risk to the exposed population of all contaminants falls within the acceptable range of 1E-04 to 1E-06. The 1E-06 risk level is specified by the EPA as a point-of-departure for determining remediation goals. For noncarcinogenic effects, cleanup levels should be based on acceptable levels of exposure as determined by EPA reference doses, taking into account the effects of other contaminants at the site. Therefore, chemical-specific ARARs serve two primary purposes:

- To identify the requirements that must be met as a minimum by a selected remedial action alternative (unless a waiver is obtained)

- To provide a basis for establishing appropriate cleanup levels.

3.8.1.2.1 Identification of Chemical-specific ARARs for Contaminants at WAGs 6 and 10. NESHAP (40 CFR Subpart H) establishes emission limits of radionuclides other than radon from DOE facilities. The standard limits an entire facility's emissions to ambient air to an amount that would not cause any member of the public to receive a dose of 10 millirem (mrem) per year. These requirements are considered potentially applicable to remedial actions undertaken in WAGs 6 and 10.

The State of Idaho's rule governing new sources of toxic air pollutants (TAPs), located in IDAPA 16.01.01.210, .585 and .586, are potential ARARs if a remedial option generates regulated TAPs. If TAP emissions exceed relevant screening levels, appropriate air modeling would determine ambient air

Table 3-6. Potential ARARs identified for WAGs 6 and 10.

Citation	ARAR Provision	Type of Requirement	Applicable or Relevant and Appropriate
IDAPA 16.01.01.210, 16.01.01.585 and 16.01.01586	Rules and Regulations for the Control of Air Pollution in Idaho (Air Toxics Rules)	C	Appl
40 CFR 61 Subpart M	National Emission Standard for Hazardous Air Pollutants—Asbestos	C	Appl
IDAPA 16.01.02	Idaho Water Quality Standards (Surface Water)	C	Appl
IDAPA 16.01.05.004 and .005	Definition of Solid Waste	C	Appl
IDAPA 16.01.05.005	Identification and Listing of Hazardous Waste	C	Appl
IDAPA 16.01.05.006	Hazardous Waste Determination	C	Appl
IDAPA 16.01.05.008	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	C	Appl
IDAPA 16.01.05.011	Land Disposal Restrictions	C	Appl
IDAPA 16.01.11	Idaho Ground Water Quality Rule	C	Appl
40 CFR 61, Subpart H	National Emission Standards for Hazardous Air Pollutants-Radionuclide Emissions from DOE Facilities	C	Appl
50 CFR 402	Endangered Species Act	L	Appl
36 CFR 65	National Landmarks Program[a]	L	Appl
16 USC 715	Migratory Bird Conservation Act	L	Appl
16 USC 703	Migratory Bird Treaty Act	L	Appl
16 USC 661 et seq.	Fish and Wildlife Coordination Act	L	Appl
16 USC 756, 757	Idaho Fish and Wildlife	L	Appl
Executive Order 1190	Wetlands Conservation	L	TBC
Executive Order 11988	Protection of Wetlands Protection of Floodplains	L	TBC
DOE Order 5400.5	Limit to workers of 100 mrem/yr and to public of 10 mrem/yr effective dose equivalent from exposures to external and internal radiation sources. Radiation exposures to the public and workers should be ALARA	C	TBC
Hazardous Waste Determination	IDAPA 16.01.05.006 (40 CFR § 262.11)	C	Appl
Risk Based Corrective Action	State of Idaho DEQ, Guidance	C	TBC

Code Key:

a. C - Chemical-specific requirement
L - Location-specific requirement
Appl - Applicable

a. No historic or archeological sites are currently expected to be impacted. The ARAR is identified pending a final determination.

concentrations. Toxic air pollutant reasonably available control technologies (T-RACTs) would be employed to control emissions if acceptable ambient air concentrations are exceeded. Should remedial action become necessary air screening analysis would determine the levels of emissions likely to be associated with the options being proposed. In addition, the Idaho Ground water Quality Rule applies to ensure protection of the ground water beneath WAGs 6 and 10. The Idaho Water Quality Rules may apply to WAG 6 or 10 remedial actions that have an impact on surface water at the INEEL. The Toxic Substance Control Act applies to the PCBs at WAGs 6 and 10. The National Emission Standard for Asbestos Emissions (40 CFR 61 Subpart M) may apply to some WAG 6 remedial activities.

3.8.1.3 Location-Specific ARARS. This subsection identifies potential location-specific ARARs that may apply to remedial actions at WAGs 6 and 10. Location-specific ARARs are regulatory requirements or restrictions on activities in specific locations that a given remedial action must meet. The following subsections identify general location-specific regulatory requirements and discuss the applicability of these requirements to WAGs 6 and 10.

3.8.1.3.1 Identification of Location-Specific Regulatory Requirements—Federal and Idaho statutes and regulations were reviewed to identify location-specific regulatory requirements that may apply to remedial activities at WAGs 6 and 10. The requirements identified in this subsection are location-specific and restrict or prohibit certain activities at or near locations similar to WAGs 6 and 10. Specific characteristics of OU 10-04 sites considered in this evaluation are its proximity to wetlands; the presence of endangered species, the proximity of surface water and the presence of archaeological and historical sites.

The following location-specific regulatory requirements, potentially apply to remedial activities at WAGs 6 and 10:

- Wetlands (Executive Orders 11990 and 11988)
- Endangered Species Act (50 CFR Part 402)
- National Historic Places (National Landmarks Program, 36 CFR Part 65)
- Migratory Bird Conservation (16 USC 715).

Determination of Preliminary Location-Specific ARARS for WAGs 6 and 10—The National Landmarks Program requirements (36 CFR 65) is a potential ARAR for WAG 6 and may be a potential ARAR for WAG 10. The remaining requirements will be further evaluated in the RI report. The EBR-I site at WAG 6 and potentially eligible sites must be protected under the National Historic Preservation Act. Any further activities that could potentially impact sites that may be identified in the future as being eligible for historic registration would be discussed with the Idaho State Historic Preservation office.

WAG 6 is not a known critical habitat for either of the T/E species observed on the INEEL (the bald eagle and peregrine falcon), nor are such species known to frequent the WAG 6 proximity. In addition to the bald eagle and peregrine falcon, twenty-four species of concern to agencies including the U.S. Fish and Wildlife Service, Idaho Department of Fish and Game, U.S. Forest Service, and BLM have been observed at the INEEL (see Table 2-1). Therefore, ARARs for T/E species apply for WAG 10 and will be analyzed further as part of the INEEL-wide ERA conducted as part of the OU 10-04 investigation. Potential impacts to endangered species may be further evaluated prior to remedial activities.

3.8.2 To-Be-Considered Criteria, Advisories, or Guidance

To-be considered criteria are advisories, guidelines, or policies that do not meet the definition of ARARs. TBC criteria may assist in determining protective criteria in the absence of specific ARARs. Preliminary TBC criteria for WAGs 6 and 10 are given in Table 3-7 and include the following:

- DOE orders
- Department of Defense (DOD) standards
- Executive orders
- Federal and State of Idaho rules pertaining to relevant subjects that are not promulgated criteria, limits, or standards (by definition of Section 121[d] of CERCLA).

Table 3-7. Preliminary list relevant TBC criteria for WAGs 6 and 10.

DOE/DOD Orders	Title
DOE Executive Orders 1190 and 11988	Protection of Wetlands
5400.5	Radiation Protection of the Public and Environment
DOD Chapter 12	Real Property Contaminated with Ammunition, Explosives or Chemical Agents of DOD 6055.9-STD.

3.9 References

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4. WORK PLAN RATIONALE

This section of the work plan discusses the rationale for future RI work beyond the evaluation of available data and information. It evaluates and identifies the data necessary to fill the data gaps identified in Section 3 and the information necessary to complete the OU 10-04 comprehensive RI/FS. It discusses the Data Quality Objectives for planned OU 10-04 field activities and documents the DQO process and rationale used by the WAG 10 team to decide the type, quality, and quantity of data that would be sufficient to support OU 10-04 environmental decision making. OU 10-04 tasks required to resolve both RI and FS data gaps are listed in Table 1-1 and further defined in Subsections 4.5 and 4.6 Subsection 4.7 discusses the assumptions, limitations, and issues that are unique to the WAG 10 comprehensive RI/FS if it is completed on the current schedule. Options for OU 10-04 issue resolution are presented, and this section ends with a recommended path forward.

4.1 OU 10-04 RI/FS Objectives

The OU 10-04 RI/FS objectives are detailed in Section 1 of this work plan.

4.2 Data Quality Objectives

The data quality objective (DQO) process was developed by EPA as a planning tool to help Site managers decide what type, quality, and quantity of data will be sufficient for environmental decision making. The process allows decision makers to define their data requirements and acceptable levels of decision errors during planning, before any data are collected. The outputs of the DQO process can be used to develop a statistical sampling design and to effectively plan field investigations that can stand up to rigorous review.

It is the goal of EPA and the regulated community to minimize expenditures related to data collection by eliminating unnecessary, duplicative, or overly precise data (EPA Guidance Directive Number 9355.9-02, September 30, 1993). At the same time, it is necessary to collect data of sufficient quantity and quality to support defensible decision making. A tradeoff results from the desire to limit decision errors and the cost of reducing decision errors. Reducing decision errors can be costly because more samples and more analyses are often required. One of the goals of the DQO process is to help decision makers strike the best balance between acceptable limits on decision errors and the cost of meeting those decision error limits.

The DQOs for planned field activities are further detailed in the FSPs (see Appendices F, G, and L) and the quality assurance project plan (QAPjP) (Baumer et al. 1997). The data collected during the RI will be used to support activities related to site characterization, risk assessment, alternative remedial action evaluations, alternative engineering designs, and worker health and safety. Each of the following general-purpose categories is intended to meet the OU 10-04 RI/FS objectives discussed in Section 1:

- *Site Characterization*—Data acquired to determine the nature and extent of contamination at WAGs 6 and 10 sites.

- *Risk Assessment*—Data acquired to evaluate the current and future comprehensive risk posed to potential human and environmental receptors by COCs at WAGs 6 and 10 sites.

- *Evaluation of Remedial Action Alternatives*—Data acquired to evaluate various remedial alternatives.

- *Engineering Design of Alternatives*—Data acquired to support design of selected alternatives.

- *Worker Health and Safety*—Data acquired to establish the level of protection necessary for workers at investigations of WAGs 6 and 10 sites. The primary source of data under this category is discussed in Section 3. Other data of this type will be collected during field activities as discussed in the health and safety plans (HASP) (see Appendices H and M) and are not identified in this section.

The FFA/CO (DOE-ID 1991) managers from DOE-ID, EPA, and the State of Idaho will be the primary users of information and data from the OU 10-04 RI/FS. Other users include technical personnel, project managers, operations managers, and members of the public.

To achieve the established DQOs, various tasks will require different levels of data quality. The selection of data categories is based on the intended use of the data and the quality assurance/quality control protocols available for the test methods being considered. The data types and analytical data categories that will be used to meet the DQOs are listed in Table 4-1. The data categories for each method specific to sampling activities for OU 10-04 are defined in the FSPs (see Appendices F, G, and L). Table 4-2 defines the two data categories. All laboratory generated data will be validated to Level A per LMITCO technical procedure (TPR)-79, "Levels of Analytical Method Data Validations" (LMITCO 1995). For further details, refer to the QAPjP (Baumer et al. 1997).

4.3 Documentation of the OU 10-04 DQO Process

The DQO process has been and will be continuously used during the life cycle of this project. During the performance of the OU 10-04 RI/FS, the scoping team may need to return to the earlier steps of this iterative process to evaluate or better focus the output. However, the DQO process particularly relates to the generation of new environmental data. The OU 10-04 RI will generate new environmental data for the following concerns: the characterization of ground water at the OMRE, the soil and soil gas sampling to be conducted at the OMRE pond area and ditch, characterization of the soil contamination at the ordnance sites, and limited sampling of on- and off-Site onions. No sampling is planned to support the comprehensive ground water assessment. The DQOs presented in this work plan were developed in consultation with DOE-ID, IDHW, and EPA-Region 10 personnel.

4.3.1 Data Quality Objectives for OMRE

The goals of sampling soil and soil-vapor at OMRE are to ensure the Agencies are provided sufficient data to make remedial decisions within a reasonable certainty and to collect only necessary data. The overall objectives associated with soil and soil gas data collection at the OMRE leach pond and adjacent ditch are to:

1. Determine the actual concentrations of organic vapors in the subsurface, including at the 75 ft. interbed.

2. Determine if the stained soil in the OMRE ditch is manmade contamination that represents a risk to human health and the environment.

3. Investigate the organic and radionuclide-contaminated soil outside the OMRE leach pond and ditch originating from the fuel washing facility and the leaching pit.

Table 4-1. Data types and analytical data categories required.

Data Types	Measurements	Analytical Data Categories	Data Validation Level
Surface soil samples	Metals	Definitive data	100% Level A
	PCBs	Definitive data	100% Level A
	SVOCs	Definitive data	100% Level A
	VOCs	Definitive and screening data	100% Level A
	Radiological	Definitive and screening data	100% Level A
	Total petroleum hydrocarbons	Definitive data	100% Level A
	Nitroaromatics	Definitive data	100% Level A
Subsurface soil samples	Metals	Definitive data	100% Level A
	Total petroleum hydrocarbons	Definitive data	100% Level A
	PCBs	Definitive data	100% Level A
	SVOCs	Definitive data	100% Level A
	VOCs	Definitive data	100% Level A
	Radiological	Definitive and screening data	100% Level A
	Nitroaromatics	Definitive data	100% Level A
Ground water samples	VOCs	Definitive and screening data	100% Level A
	Water levels	Definitive data	100% Level A
Physical properties of soil as required for GWSCREEN modeling	Particle size	Definitive data	100% Level A
	Hydraulic conductivity	Definitive data	100% Level A
	Undisturbed density	Definitive data	100% Level A
	Moisture content	Definitive data	100% Level A
	Visual inspection of subsurface soil samples	Definitive data	100% Level A
	Porosity	Screening data	Unvalidated

Table 4-2. Data categories.

Data	Definition
Screening data	Screening data are generated by rapid, less precise methods of analysis with less rigorous sample preparation. Sample preparation steps may be restricted to simple procedures such as dilution with a solvent instead of elaborate extraction/digestion and cleanup. Screening data provide analyte identification and quantification, although the quantification may be relatively imprecise. At least 10% of the screening data are confirmed using analytical methods and quality assurance/quality control procedures and criteria associated with definitive data. Screening data without associated confirmation data are not considered data of known quality.
Definitive data	Definitive data are generated using rigorous analytical methods, such as approved EPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. Methods produce tangible raw data (e.g., spectra, chromatograms, and digital values in the form of paper printouts or computer-generated files). Data may be generated onsite or offsite, as long as the quality assurance/quality control requirements are satisfied. For the data to be definitive, either analytical or total measurement error must be determined.

These objectives require screening data and definitive analytical data arrived at through soil sampling and laboratory analysis. Physical information, such as strong odors, evidence of anthropogenic debris, and stained soil, will be used to detect and locate areas of potential contamination requiring additional characterization. These data are chiefly intended to support potential remediation and aquifer well drilling, and proper disposal. Please see the FSP located in Appendix G for a more detailed discussion on the sampling requirements and on data quality.

The objective of the OMRE ground water sampling is to identify if a source of contamination and a corresponding threat exists in a complete exposure pathway.

The decision error corresponding to the above sampling plans cannot be quantified since a statistical sampling design has not been used. However, EPA guidance states that:

> "Non-probabilistic or subjective (judgmental) sampling approaches can be useful and appropriate for satisfying certain field investigation (study) objectives. For instance, if the study objective is to locate and identify potential sources of contamination a subjective identification of sampling locations may be the most efficient method to employ. If the objective is to establish that a threat exists in a complete exposure pathway by confirming the presence of a hazardous substance associated with the site or process, a judgmental sampling approach can be used". (EPA Guidance Directive No. 9355.09-02 September 30, 1993 page 5).

4.3.2 Data Quality Objectives for the Ordnance Sites

Soil sampling at the ordnance sites include the following data quality objectives:

1. To determine the presence or absence of nitroaromatic soil contamination.

2. To determine the type of nitroaromatic concentration (e.g., TNT, RDS, DNB, etc.).

3. To determine the average concentration of nitroaromatic concentration across the site within the top 0–1"of soil.

4. To determine if the average concentration of nitroaromatic concentration at the site exceeds the project remediation goals to be determined during the RI/BRA.

Additionally, several sites had small spots of unidentified soil stains that require further characterization as to type of contamination. A random-based statistical sampling approach was applied to the large ordnance areas outside the craters. The craters will be systematically sampled and the small uncharacterized soil stains will be sampled using a biased composite approach to ensure the most visibly contaminated soil is collected. This approach is defined in the FSP and will provide a confidence level of 90%. For more detail, please refer to Section 4 of the FSP located in Appendix F.

4.3.3 Data Quality Objectives for Ground Water

It is assumed that ground water problems will be addressed by the individual WAGs. It is also assumed that all existing ground water data is valid and its quality is satisfactory or its use. Since the DQO process relates to the collection of new environmental data, and because no new environmental data will be collected in support of the OU 10-04 ground water risk assessment, there are no DQOs associated with this activity. Limited ground water sampling will be performed at the OMRE and is discussed under heading 4.3.1.

4.3.4 Data Quality Objectives for the Ecological Risk Assessment

Since the DQO process relates to the collection of new environmental data, and because currently no new environmental data will be collected in support of the OU 10-04 ecological risk assessment and baseline risk assessment, there are no DQOs associated with these activities.

4.4 Data Needs and Types

The initial evaluation of available data found in Section 3 pinpointed data gaps. The data gaps are further refined into DQOs and data necessary to complete the RI/FS. In Table 1-1, the data gap is listed with the RI and/or FS task to resolve the gap.

4.5 OU 10-04 Tasks to Resolve RI Data Gaps

4.5.1 Resolution of RI Data Gaps for OMRE and STF

The nature of contamination at OMRE is chiefly organic and radioactive. Contamination at OMRE is known to exist in the surface and subsurface, but its extent is not defined. Contamination is possible in the basalt and interbeds, in the aquifer, and in a nearby ditch. These OMRE areas will be investigated with a combination of field screening, sample collection, and laboratory analysis. The Appendix G FSP outlines the tasks. The field screening in boreholes will include geophysical logging and gamma and beta logging, SVOC/VOC measurements (e.g., GC) both from the boreholes and vapor ports. Radiation field screening will include hand-held and vehicle-mounted radiation instruments that will screen area surface soils and core samples. Laboratory analyses will include soil samples for geotechnical properties, radionuclides, and SVOC/VOCs.

In addition, stained soil of unknown composition is present in the OMRE ditch. The stained soil in the OMRE ditch is suspected of being an organic material. To investigate the nature of the stained soil in the OMRE ditch, samples will be collected directly from the stained soil for EPA Appendix IX SVOC/VOC and polychlorinated biphenyl (PCB) analyses. Samplers will also collect a composite sample from a similar depth in adjacent locations that do not appear visually to contain the stained soil.

At the request of the Agencies (DOE-ID, EPA Region ID, IDHW-DEQ), a radionuclide-contaminated soil screening survey will be completed in the OMRE area and ditches using the "Humvee" mounted detector system. The results of this screening survey showing gamma-emitting radionuclide activity will be graphically depicted on a map, and may result in a need for confirmatory sampling.

The STF will be evaluated in a Track 1 and is expected to be recommended for a Track 2 investigation. The remaining OU 10-04 sites will be evaluated using existing data. Several sites listed in Table 1-1 have been retained for further risk assessment although no source exists, because further evaluation is warranted to ensure consistency with other WAGs. More discussion on how the sites were screened can be found in Appendices B and C.

4.5.2 Resolution of RI Data Gaps for Ordnance Sites

Ordnance sites have three remedial components. The first component concerns the UXO or live bombs and chunks of explosives (TNT or RDX) that require detection and either detonation in place or removal to the Mass Detonation Area for detonation. The second component concerns the soil contamination that may remain after the UXO removal is complete. In some cases, the ordnance sites have a third component concerning additional soil stains that are unrelated to ordnance such as fuel stains or burn stains.

The unique nature of ordnance explosive potential combined with chemical contamination that has been released to soil may require the use of unique remedial action combinations at the ordnance sites. For example, both excavation and treatment and long-term institutional controls (e.g., deed restrictions) may be required at some ordnance sites to completely protect future workers and residents.

All sites have been evaluated during the Track 2 for potential UXO and soil contamination. Some ordnance sites have no soil contamination and some have pieces of TNT lying on or just below surface ranging from the size of a golf ball to tiny flakes. During the Track 2, sites were classified in three categories: (1) Sites with no UXO and therefore no soil contamination. (2) Sites with no visible soil contamination from which low-ordered or split open bombs with explosive compounds were removed and therefore the potential for soil contamination, and (3) Sites with visible soil contamination ranging from small spots to large fields of stained soil. All sites with potential soil contamination require a random based sampling and analyses to determine presence and average concentration of nitroaromatic contamination. See the FSP in Appendix F for details. Additionally, options such as infrared aerial surveys will be considered during development of the RI/FS if the determination is made that the boundaries of the ordnance sites require better definition.

For all UXO remediation the following alternatives will be reviewed in the FS: (1) No action, (2) Containment, (3) Excavation and detonation, and (4) Institutional Controls. The excavation and detonation alternative would include the Army Corps of Engineers' accepted and recommended approach of basic "Mag and Flag" technology as well as new technologies. A research paper regarding types of management and examples of institutional controls will be presented in the RI/FS.

The explosive soils are defined by the Army Corps of Engineers as containing 10% or greater of nitroaromatic components. These pieces, usually TNT or RDX, are removed during the UXO remediation. The remaining soils must then be characterized and evaluated to determine if a potential source of contamination exists in a complete pathway. It has been determined through risk analysis and agency conference calls during the OU 10-03 Track 2 in anticipation of the ecological risk assessment that the OU 10-04 RI/FS remediation goals for TNT would be 47 mg/kg, 18 mg/kg for RDX, and 35 mg/kg for DNT. These levels are conservative and protective of ecological receptors as well as human health. However, these remediation goals will be reevaluated during the RI/BRA. Retained soil contaminated sites will have the following alternatives reviewed in the FS: (1) No action, (2) Containment, (3) Excavation and treatment, (4) In Situ treatment, and (5) Institutional Controls. Two alternatives for the treatment of nitroaromatic contaminated soils will be reviewed. (1) Bioremediation and (2) Incineration—both alternatives are proven technologies. A bioremediation treatability study will be performed in 1999 during the RI to evaluate the bioremediation of INEEL specific soils. This information will feed to the FS. Incineration was the recommended and chosen alternative in the OU 10-05 ROD. For additional detail, refer to Table 1-1.

The following text summarizes the remaining OU 10-03 scope that was handed off to OU 10-04. For more detail concerning the ordnance sites, see the *Preliminary Scoping Track 2 Summary Report for*

Operable Unit 10-03 Ordnance, (Sherwood et al. 1998). All ordnance sites will be reevaluated during the OU 10-04 RI/FS.

Four ordnance sites have a high probability that UXO currently is present at or near the surfaces: (1) Rail Car Explosion Area (10.83 ha [26.72 acres]), (2) NODA (5.56 ha [13.73 acres]), (3) Mass Detonation Area (40 ha [100 acres]), and (4) Land Mine Fuze Burn Area (0.77 ha [1.87 acre]). These boundaries were determined during the Track 2 and are not proven.

The perimeter area includes: (1) Mass Detonation Area (193 ha [477 acres]), and (2) Rail Car Explosion Area (95 ha [234 acres]).

Sampling and analyses are planned for performance in FY 1999 at eleven sites to verify that the average concentration at the site is below soil contamination levels (47 mg/kg for TNT, 35 mg/kg for DNT, and 18 mg/kg for RDX) for nitroaromatics. These sites include: (1) Experimental Field Station, (2) NOAA Grid, (3) Fire Station II Area, (4) NODA, (5) Land Mine Fuze Burn Area, (6) Rail Car Explosion Area, (7) UXO Site East of TRA, (8) Craters East of INTEC, (9) the craters at the Mass Detonation Area, (10) the craters at the NODA, and (11) Burn Ring. The Experimental Field Station has approximately one acre of confirmed TNT-contaminated soil that will require remediation.

The craters at NODA and the Mass Detonation Area will be sampled and analyzed to characterize the potential soil contamination for nitroaromatics and metals. Based on existing data collected at the NODA craters, these soils will most likely require treatment for explosive compounds. Excavation of these soils may require a remote excavator due to the potential risk of unexploded ordnance. The burn ring south of the Experimental Field Station will be sampled to characterize the potential soil contamination for nitroaromatics, metals, PCBs, VOCs, and SVOCs. For additional ordnance sampling data detail, see the FSP in Appendix F.

Agency RPMS have requested specific qualitative human health risk assessments for UXO performed at three sites. These sites include (1) the Explosive Storage Bunkers North of INTEC, (2) the Juniper mine, and (3) the NODA.

All sites will be evaluated for ecological risk assessment, however, the following sites will be evaluated for ecological risk assessment because of their potential for soil contamination: Experimental Field Station, NOAA Grid, Fire Station II Area, NODA, Land Mine Fuze Burn Area, Rail Car Explosion Area, UXO Site East of TRA, Craters East of INTEC, and CFA-633 Firing Site.

It has been proven that no live rounds were fired at the Naval Ordnance Test Facility toward the Big Southern Butte during the test firing of the gun barrels in 1969. Historical photos, newspaper articles, and a memo of conversation signed by the supervisor of the testing are included in Appendix N.

4.5.3 Resolution of RI Data Gaps for Ground Water

Existing hydrologic and geochemical data collected from a variety of sources have been examined; however, several recently published and important documents have not yet been reviewed. Review of all available data will occur during the RI. A number of strengths and weaknesses in the existing data set have been identified based upon the data review for this work plan. A fundamental strength of the ground water data is the presence of numerous monitoring wells near several facilities at the INEEL, including data from a relatively long monitoring period. These wells have provided information to develop a general understanding of the ground water dynamics of the INEEL, the distribution of ground water plumes, and to make predictions on the future plume geometry. In additional, several site-specific investigations of WAGs 1 through 9 have examined in detail portions of the aquifer at the INEEL. Weaknesses in the data set are due to a lack of the following:

- Monitoring wells for vast regions of the aquifer
- A comprehensive conceptual ground water flow model at an INEEL-wide scale particularly in a 3-dimensional aspect.
- Coordination among site-specific investigations.

Wells that were drilled by WAG-7 during the summer of 1998 will greatly enhance the understanding of the large contaminant plumes between TRA/INTEC and the RWMC. Based on the results of ground water samples from these wells, several data gaps for OU 10-04 may be addressed. However, currently several additional wells have been budgeted for out years under OU 10-04 in case additional questions remain unresolved regarding the commingling of plumes from various sources.

Recent and ongoing research indicates that preferential fast-flow paths may exist at the INEEL and that an assumption of a large homogeneous isotropic media from modeling contaminant flow is inappropriate. This new research is based on analysis of natural isotopic ratios which are used to identify or "finger print" water within the aquifer. Mapping of the isotopic ratios across the INEEL suggest that certain areas of the aquifer are relatively stagnant while other areas have much faster flowing water (Johnson et al. 1997). Continued research may indicate the need for additional wells within the "fast flow paths" to ensure a complete understanding of the plume geometries and for long-term monitoring.

Presently, agreement among the agencies has lead to the establishment of the following tasks for inclusion in the FSP for filling data gaps associated with ground water:

1. Review and compilation of ground water data to ensure that sufficient data will be available to develop a post-ROD ground water monitoring plan. It is envisioned that this task will rely primarily on data supplied from other WAGs, the USGS, and the Wastewater and Land Application Permit (WLAP) monitoring programs. Specific information or monitoring data may be needed in certain areas where this information is not available from other sources. Trend analyses will be performed on representative contaminants and wells to establish appropriate protocols for assessing compliance during 5-year reviews.

2. An analysis will be made of available geochemistry data including data collected by the USGS and DOE research projects. This information will be summarized and interpreted with respect to the identification of fast-flow paths and the appropriateness of on-going and proposed monitoring. Out-year funding will budget for two ground water wells that may be required to evaluate putative fast-flow paths near USGS-83.

3. A review of surface water/ground water interaction prepared during WAGs 3 and 7 will be performed, as scheduling allows, to assess the general understanding of surface water recharge to the aquifer and perched water. This analysis will evaluate cross-cutting issues for the two facilities on surface water infiltration and contaminant mobility. If required, several neutron access tubes may be installed by WAG 3 and/or 7 near the channel of the Big Lost River, particularly between the Big Lost River and INTEC and between the INEEL spreading areas and the RWMC. It is assumed that installation of any potentially required neutron access tubes will be covered by WAG-specific field sampling plan.

4. An aquifer quality baseline assessment will be made using existing data to document the quality of ground water flowing to (influx) and off (effluent) the INEEL. This information will be presented in the context of regional contaminant problems.

5. Additional field investigations and data interpretation will be made to determine the significance of 1,1,1-trichloroethane (TCA) contamination near OMRE. These activities are detailed in Appendix G and will include the following:

    a. Pull OMRE pump and resample

    b. Log OMRE well geophysically

    c. Evaluate alternative sources of TCA

    d. Evaluate upgrading OMRE production well to monitoring well

    e. Soil gas survey

    f. Ground water sampling

    g. Source term estimate.

6. Perform GWSCREEN modeling of transport of 1,1,1-TCA to the aquifer and perform a BRA.

7. Use superposition analysis of modeled plumes from other WAGs to estimate cumulative risk where plumes overlap. Perform BRA as needed. Determine if this approach is conservative by reviewing flow paths from regional models, if warranted, perform a particle tracking analysis of flow in the aquifer beneath the INEEL and look at plume commingling. Evaluate 3-D aspect of INTEC plume as it flows southward towards the RWMC.

8. Review and participate on an ongoing basis all ground water issues and decisions established for the various WAGs. Assess if any potential exists for WAG level contamination to present a continuing risk at the INEEL level.

4.5.4 Resolution of RI Data Gaps for Ecological Risk Assessment

The WAGs 6 and 10 sites retained in Table 1-1 have not been evaluated for ecological risk. For more detail concerning ecological screening of WAGs 6 and 10 sites, see Appendix C. Additional data gaps have been identified in association with performing the comprehensive ERA for OU 10-04. These are discussed in detail in Appendix C.

4.6 OU 10-04 Tasks to Resolve FS Data Gaps

Table 1-1 lists the potential remedial alternatives anticipated to be addressed in the OU 10-04 FS and the OU 10-08 FS. The alternatives are included as justification for the data gaps identified in Section 3 and further discussed in Section 4. Of the sites retained, limited screening of remedial alternatives is anticipated at all the sites, with a few exceptions. Evaluation of a limited set of remedial alternatives at the sites may be justified due to a number of reasons. For example, several sites have been retained where no source of contamination is present. In most cases, the site was never evaluated for ecological risk. In some cases, the previous risk assessment did not take into account the TPH data, or a removal action was performed and the residual risk will be evaluated. An additional reason some sites were retained with no source is to ensure consistency with the other WAG decisions. A majority of the sites have been retained with the only remaining action listed as an additional risk evaluation for ecological or cumulative risk and are not anticipated to require remediation as previously explained. The justification for retaining the sites is summarized in Table 1-1 and discussed in Appendix B.

The remedial alternatives to be evaluated will be grouped by alternative, media, and contaminant, as appropriate, to capitalize on economies of scale which could be realized during the OU 10-04 RD/RA. The groupings may include radionuclide-contaminated soils (OU 10-02), explosive-contaminated soils (OU 10-03), potential mixed-contaminated soils (OU 10-01), unexploded ordnance removal (OU 10-03), metals contaminated soils (STF-02), etc.

For all ordnance areas, the following alternatives will be reviewed in the FS: (1) No action, (2) Containment, (3) Excavation and detonation, and (4) Institutional Controls. The excavation and detonation alternative would include the Army Corps of Engineers' accepted and recommended approach of basic "Mag and Flag" technology as well as new technologies.

It is assumed the WAG-specific RI/FS RODs and RD/RA will be sufficient for remediation of the ground water pathway, thus the OU 10-08 ROD will simply require continued institutional controls with monitoring at the regional scale. Potential alternatives for other sites that will be evaluated during the OU 10-04 FS include, but are not limited to, (1) No action, (2) Containment, (3) Excavation and treatment, (4) In Situ treatment and (5) Institutional Controls. Refer to Table 1-1 for specific detail.

Monitoring is anticipated for most sites retained and the details of the monitoring plan will be determined following the ROD. The feasibility of ground water alternatives will be evaluated separately within the individual WAGs.

The WAGs 6 and 10 sites to be evaluated in the OU 10-04 ERA are in various stages of characterization, assessment, and remediation, and will subsequently result in different FS strategies. For example, characterization, assessment, and remediation have already occurred at some sites (generally based on human health cleanup criteria), while at other sites characterization and/or assessment have yet to be completed. For the remediated sites, the post-remediation data will be evaluated to determine risk to ecological receptors from residual contamination. For these sites, potential FS alternatives for ecological receptors are anticipated to include no action, institutional control, and/or containment capping. In contrast, for the uncharacterized and/or unassessed sites, potential FS alternatives for ecological receptors could result in additional recommendations for remediation strategies as shown in Table 1-1.

As shown in Table 1-1, the OU 10-04 ERA will also re-evaluate selected sites of the WAG ERAs from a Site-wide perspective. The disposition of sites of potential ecological concern is not consistent from WAG to WAG and within WAGs. Some WAGs decided to leave the evaluation of sites with potential risk to ecological receptors for reevaluation during the OU 10-04 ERA, some remediated sites to be protective of ecological receptors based on the ERA results, and other sites were remediated solely for human health. The OU 10-04 ERA will assess the risk to ecological receptors from unremediated sites and the residual contamination from the remediated WAG sites. The results of the residual evaluation of risk to ecological receptors from remediated sites at the WAGs are anticipated to result in FS alternatives of no action, institutional control, and/or containment capping. The sites at the WAGs that were unremediated and that present potential risk to ecological receptors will be reevaluated in the OU 10-04 ERA.

In addition to the WAGs 6 and 10 sites, two issues important to OU 10-04 ecological receptors remain. First, remaining areas of concern consist of plumes of windblown or otherwise dispersed contamination at low to moderate levels just outside the WAGs. It should be noted that these plumes of measurable dispersed contaminant, e.g., rad-contaminated soils, are not very large in area relative to the entire INEEL site area, but may be "large" relative to contaminated areas within the WAGs. Also that it is highly uncertain whether the sinks or spreading areas have been contaminated by historic releases, but should be evaluated due to the importance of these locations. For this type of contamination, remediation may not be a desirable option due to the potential of a more severe adverse physical disturbance effect from the remediation. Second, based on a number of existing studies, there is evidence that movement of contamination into the foodweb has occurred. It is assumed that the remediation occurring at the WAG levels will eliminate or minimize the source of this contamination, however, it would be extremely difficult and undesirable to remediate contamination that is already present in the foodweb (as it would require the elimination of animals and plants). This task would only be undertaken if immediate adverse effects were evident. Therefore, the remedial alternatives for the exposure at this level will likely include no action and/or institutional control.

In the event the OU 10-04 ROD requires an RD/RA action for protection of ecological receptors, the planning and responsibility will remain with WAG 10, but any work would be coordinated with the WAG managers to ensure consistency with the RODs and to make the best use of resources. Possible ecological RD/RA activities are being planned in the OU 10-04 RD/RA baseline. WAG 10 is assuming that if the WAG-specific RODs are signed stating further evaluation of the ecological issues will be performed in WAG 10, then an OU 10-04 decision on a WAG site will be consistent with the WAG ROD and the WAG-specific ROD will not have to be reopened.

4.7 OU 10-04 RI/FS Assumptions

This section of the work plan discusses the assumptions that are unique to the WAG 10 comprehensive RI/FS.

Many of the assumptions discussed below have been more thoroughly discussed in previously drafted and submitted technical memoranda. These documents include *Approach and Data Gap Identification for OU 10-04 INEL-Wide Ecological Risk Assessment Technical Memorandum* (INEL-96/0145) November 1996; *Guidance Protocol for the Performance of Cumulative Risk Assessments at the INEL* (INEL-95/131) May 1995; *and OU 10-04 Ground Water Strategy Technical Memorandum* (INEL-96/0082) November 1996.

4.7.1 Assumptions

Subsection 4.7.1 is organized into the following subsections: Scheduling, Ground Water Assessment, Ecological Risk Assessment, Ordnance Assessment, and OMRE Assessment. Grouping the assumptions by media is intended to help focus the reader and facilitate discussion on the prominent issues.

4.7.1.1 Scheduling. The Work Plan is based on the following assumptions:

- The OU 10-04 Comprehensive RI/FS must have data from the Comprehensive RI/FS from OU 3-13, OU 3-14 and OU 7-13/14. The OU 3-14 project is not expected to meet the OU 10-04 deadline for input, so the assumption is made that data developed under OU 3-14 will not be needed to complete the OU 10-04 RI/FS.

- New scope, including shifting sites from other WAGs to WAG 10, identification of significant new release sites and development of major programmatic policies (e.g., partial delisting strategies, land use strategies, National Environmental Policy Act strategies, etc.) will be added to WAG 10 as part of OU 10-04B.

4.7.1.2 Ground Water Assessment. The Work Plan is based on the following assumptions:

The purpose of the OU 10-04 RI/FS ground water assessment is to:

1. Assess the risk from ground water for WAG 6 and 10 sites.

2. Qualitatively evaluate the predicted INEEL cumulative ground water risk for the 100-year scenario for the 5 contaminants with the most restrictive risk results from areas of commingled plumes between WAGs with the assumption that the selected ground water remedy has been implemented for each individual WAG.

3. Compile a summary of the INEEL WAG ground water activities and monitoring results for a comprehensive discussion on the Snake River Plain Aquifer and to serve as the basis for development of a comprehensive INEEL post-Rod ground water monitoring plan.

    a. A critical assumption is that the OU 10-04 ROD will select long-term monitoring as the selected remedy for ground water, due to the individual WAGs being responsible for assessment and remediation of the ground water plume originating from the WAG. During the first 5-year review, WAG 10 may re-address cumulative ground water risks that may be of concern, as needed. Information from the WAG RODs, RD/RA activities, and post-ROD monitoring would be evaluated to ensure the INEEL-wide ground water decision in the OU 10-04 ROD is still protective.

    b. It is assumed that ground water problems will be addressed by the individual WAGs, and any required treatment would be implemented at the source or WAG level. WAG 1 is currently responsible for treatment and monitoring of the TAN ground water plume. WAGs 3, 4, 5, and 7 are currently evaluating the need for remedial action(s) to protect receptors from potential ground water contamination.

    c. The individual WAGS are responsible for identification of the WAG-specific ground water monitoring needs. Few new wells for INEEL ground water monitoring are anticipated outside the WAG boundaries, other than the wells identified in the INEEL site-wide Ground Water Monitoring Plan. The ER post-ROD ground water monitoring will also be integrated to enable level loading of the resources and consolidation into a single program to enhance quality, efficiency, and reproducibility; to standardize data management; and to potentially reduce costs. The post-ROD ground water monitoring integration will be handled internally as each WAG specific comprehensive ROD is signed and/or long-term ground water monitoring established.

    d. It is anticipated that ground water risks will be addressed qualitatively (i.e., without extensive numeric calculations) in the OU 10-04 RI/FS. This qualitative assessment will incorporate information from the WAG-scale ground water modeling performed for most of the Comprehensive RI/FSs. Currently, there is no plan to perform an OU 10-04 FS for ground water. To perform the OU 10-04 qualitative assessment and cumulative risk assessment, the predicted WAG ground water plumes for the residential scenario 100 years in the future (for the five contaminants with the most restrictive risk results) will be superimposed on an INEEL-scale map. Areas of predicted plume overlap will be carefully evaluated to determine the depth, discrete commingling, and the potential for a residential well.

4.7.1.3 Ecological Risk Assessment. This Work Plan is based on the following assumptions:

- The comprehensive investigations at WAGs 1–7 have identified release sites that have calculated ecological HQs in excess of 1. In some cases, the WAGs have passed these sites to OU 10-04 for evaluation of population level ecological risks and/or reevaluation using refined exposure models. If indicated by the OU 10-04A ERA, WAG 10 will have to incorporate remediation of these sites for ecological risk into the WAG 10 schedule.

- The exposure modeling performed for screening ecological receptors at the WAG level will be adequate for evaluating INEEL-wide receptors.

- The baseline for ecological receptors will be established during long-term monitoring if determined necessary.

- The current scenario for ERA, with the fences down, will be bounding for all future scenarios with the exception of buried waste sites. Since it is not anticipated that concentrations of contaminants in the environment will change over time with the exception of buried waste (due to potential intrusion).

- Human health data taken for risk assessment purposes are adequate for the ERA. It is assumed that detection limits and COPCs were adequately addressed for ecological receptors during past risk assessment activities focused on human health risks.

- It will be possible to complete a comprehensive OU 10-04 ERA (also called the Site-wide ERA) without results from OU 3-14 and OU 7-13/14 being available.

Additionally, schedule, budget, and technical limitations cause extensive assumptions in the OU 10-04 ERA. As discussed in detail in Appendix C2, these include assumptions concerning characterization of contaminants in biota, biological surveys, WAG ERA results, characterization of contaminant content and concentration, Environmental Science and Research Foundation (ESRF) data and dose reconstruction, INEEL species distributions and populations, exposure and pathway modeling, input parameters and spatial and temporal scales, assessment endpoints, and aquatic foodwebs.

For example, additional site-specific sampling is currently not planned to characterize tissue concentrations in biota. As summarized from Appendix C2, this will require the following assumptions in the OU 10-04 ERA:

- The five onsite and five offsite sets of biotic data sampled in 1997 combined with ESRF studies will be adequate to characterize tissue concentrations, evaluate exposures, and verify foodweb models for the WAG ERAs and the OU 10-04 ERA.

    - This information will also be adequate to extrapolate tissue concentrations in nonsampled receptors (including avian and/or carnivores) of concern from similar sampled contaminants and similar species.

- Tissue will not be sampled to evaluate dose in aquatic species. Aquatic species tissue concentrations will be extrapolated using aquatic foodweb modeling and limited ESRF data.

- The 1997 biotic sampling data will be representative of the INEEL.

- The contaminants sampled in 1997 biotic samples will fully represent the final OU 10-04 COPC list.

4.7.1.4 OMRE Assessment. The Work Plan is based on the following assumption:

A proposal for additional sampling is being developed for the OMRE area in response to a DOE-ID comment. However, this proposal is being included in the Work Plan by placeholder text only because of the short turnaround time to EPA and IDHW-DEQ. The following placeholder text covers five basic areas of concern at OMRE, the potential for additional wells, the proposal for added sampling, and the preliminary conception of the new soil sampling design. Appendix G has been pulled from the Draft Final of this Work Plan. A revised FSP (Appendix G), that will require review and comment from DOE-ID, EPA, and IDHW-DEQ, will be provided to the Agencies when it is complete. Upon finalization, the revised Appendix G FSP will be incorporated into the Final Work Plan.

At least five areas of concern exist at OMRE. These are the OMRE leach pond, the OMRE ditch, the OMRE groundwater plume, the OMRE organic vapor plume, and the OMRE hotspot area. Additional sampling over that scoped with the Agencies during Work Plan scoping is being recommended in the OMRE leach pond, the OMRE ditch, and the OMRE hotspot area. The following paragraphs discuss the five areas of concern.

4.7.1.4.1 OMRE Leach Pond—The first area of concern is the OMRE leach pond. The OMRE leach pond soil was sampled down to basalt in six locations in FY-97 for metals and radionuclides. The results indicate radionuclide-contaminated soil is present, but do not indicate the presence of metals contamination. In short, if the pond were to be excavated, it is presumed the present data are sufficient if the OU 10-06 NTCRA methods are used to guide the excavation.

4.7.1.4.2 OMRE Ditch—The second area of concern is the OMRE ditch. This ditch was connected to the OMRE leach pond and other OMRE waste streams in the past. This ditch was sampled down to basalt in two locations in FY-97 for metals and radionuclides. One location sampled was in the ditch near the pond. The other location sampled was in one of two radioactive hotspots discovered in FY-97 by field surveys approximately 300 ft downgrade from the pond. This downgrade location also contained an unknown material that has stained the soil. Radionuclide-contaminated soils were found in the biased downgrade location, which was expected, and in the upgrade location.

4.7.1.4.3 OMRE Hotspot Area—The third area of concern is the OMRE hotspot area. This area, adjacent to and slightly uphill to the west from the OMRE leach pond, contains approximately one dozen radioactive hotspots that are detectable by field screening. The hotspots were presumed to be windblown particulate, which had been disturbed by D&D grading in about 1980. New information gathered since sampling occurred indicates the area was likely subject to ongoing liquid releases that could have contained organic compounds and radionuclides. Because liquid releases did occur, the contamination could be present at depth.

4.7.1.4.4 OMRE Ground Water Plume. The fourth area of concern is the OMRE ground water plume. It is not currently known if a ground water plume actually exists. It is known that large volumes of aqueous and organic liquid wastes were discharged to the OMRE leach pond, that high rates of infiltration into the basalt have been observed, that an organic vapor plume exists that contains 1,1,1-TCA, and that traces of 1,1,1-TCA have been detected in the badging facility well in the drinking water program.

4.7.1.4.5 OMRE Organic Vapor Plume—The fifth area of concern is the OMRE organic vapor plume. Organic compounds were identified in the subsurface in FY-97 with a passive soil-gas screening survey. The expected compound, xylene, was not detected, but several other compounds, chiefly 1,1,1-TCA, were. Though the screening survey was beneficial, it was limited in that it quantified neither concentrations nor depths. In addition, the chosen grid pattern neither bounded the lateral extent nor definitively located areas of highest concentrations.

4.7.2 Recommendations

The OU 10-04 RI/FS SOW identified an accelerated schedule from the schedule listed in the FFA/CO. Since the Final SOW was published, delays in the other WAG-specific comprehensive RI/FSs have resulted in reconsideration of the OU 10-04 schedule because the FFA/CO planned that the OU 10-04 RI/FS would be the final INEEL comprehensive RI/FS.

The current agreement that has been developed by the agencies involves delaying the OU 10-04 RI/FS until after RODs have been signed for all operable units besides OU 3-14. This agreement will allow OU 10-04 to incorporate final sampling, modeling, and analysis data from most of the WAGs. See Section 6 for details of the proposed OU 10-04 schedule.

4.8 References

Baumer, A. R., S. C. Flynn, R. G. Thompson, C. S. Watkins, 1997, *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites*, DOE/ID-10587 Revision 5.

Becker et al., 1998, *Interim Risk Assessment and Contaminant Screening for the Waste Area Group 7 Remedial Investigation*, DOE/ID-10569, Draft, Revision 2.

DOE/ID-10441, June 1993, *Idaho National Engineering Laboratory Groundwater Monitoring Plan.*

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, U.S. Department of Energy Idaho Field Office, U.S. Environmental Protection Agency Region 10, State of Idaho Department of health and Welfare.

EPA, 1993, *Data Quality Objectives Process for Superfund*, 9355.9-02.

EPA, 1989, "Risk Assessment Guidance for Superfund," *Volume 1, Human Health Evaluation Manual*, Part B, Interim Final, EPA/540/1-89/002.

LMITCO, 1995, Technical Procedure Requirement (TPR)-79, "Levels of Analytical Method Data Validations."

Sherwood, J. A., et al., 1998, *Preliminary Scoping Track 2 Summary Report for Operable Unit 10-03 Ordnance*, DOE/ID-10566.

5. REMEDIAL INVESTIGATION/FEASIBILITY STUDY TASKS

The OU 10-04 RI will include a variety of tasks related to scoping, implementation, and decision making under the FFA/CO. Standard RI/FS tasks have been identified by the EPA (EPA 1988) to provide consistent reporting and to allow more effective monitoring of RI/FS projects. Discussed below are the proposed activities in each task that are part of the WAGs 6 and 10 comprehensive RI/FS. Specific field activities are described in the FSPs (see Appendices F, G, and L).

5.1 Project Plan and Scope

The project planning and scoping tasks, of which this work plan is a part, involve activities necessary to initiate the OU 10-04 RI/FS. Project planning identifies the sequence of site activities required to complete the investigation. The following subsections describe the plans developed as part of the planning and scoping process. These plans are prepared in accordance with the EPA document titled, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 1988).

5.1.1 OU 10-04 Remedial Investigation/Feasibility Study Work Plan

This work plan presents the initial evaluation and summary of existing data and information gathered in the scoping process. It also documents decision types identified during project scoping and defines activities to be conducted in response to the identified decision types. The RI/FS work plan includes the following elements:

- A description of the site background and physical setting
- A project description, including project management organization and responsibilities
- A review of site evaluations
- A discussion of DQOs
- A schedule for and description of the work tasks to be performed
- A schedule of deliverables associated with the OU 10-04 RI/FS.

Previous FFA/CO investigations including Track 1s, Track 2s, RODs, and interim actions will be reviewed in this work plan. Information related to WAGs 6 and 10 facilities is also reviewed to investigate how these facilities may affect cumulative risk at WAGs 6 and 10.

5.1.2 Field Sampling Plans and Quality Assurance Project Plan

The FSPs (see Appendices F, G, and L) contain the sampling objectives, the sample locations and frequency, sample designation, sampling equipment, and sample handling and analysis. The referenced Quality Assurance Project Plan (QAPjP) (Baumer et al. 1997) includes procedures designed to ensure sample integrity, precision and accuracy in the analytical results, and representativeness and completeness of environmental data. The QAPjP is not an attachment to this work plan but is available through the administrative record. The QAPjP (Baumer et al. 1997), written in accordance with RI/FS guidance (EPA 1988) discusses the following elements:

- INEEL environmental restoration (ER) description
- Project organization and responsibility, including the names of individuals responsible for ensuring that the environmental data collected are valid
- Quality assurance objectives for data including required data precision, accuracy, representativeness, completeness, and allowed usage of the data
- Sample custody procedures and documentation
- Calibration procedures and frequency
- Analytical procedures with references to applicable standard operating procedures
- Data reduction, validation, and reporting procedures
- Internal quality control procedure description or reference
- Performance and system audits
- Preventive maintenance procedures
- Specific routine procedures used to assess data accuracy, precision, and completeness
- Corrective action procedures
- Quality assurance reports including results of system and performance audits and assessments of data accuracy, precision, and completeness.

5.1.3 Health and Safety Plans

The Health and Safety Plans (HASPs) (see Appendices H and M) detail health and safety measures for field activities. The HASPs discuss personal protective equipment, medical surveillance requirements, and applicable safety procedures. The HASPs include the elements described in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH/OSHA/USCG/EPA) and 29 CFR 1919.120, "Hazardous Waste Operations and Emergency Response."

5.2 Community Relations

Community relations activities for the OU 10-04 RI/FS will be guided by the *INEEL Community Relations Plan*. This plan is a guide to public involvement and community relations in the ER program at the INEEL. It was developed to involve the community in the environmental cleanup decision-making process. Copies of the *Community Relations Plan* may be reviewed at the information repositories listed at the end of this section or by calling the INEEL's toll-free number, 1-800-708-2680.

Community relations activities for the OU 10-04 RI/FS, which coincide with important phases of the project, are designed to keep the public informed and involved. The following include the community relations activities and their schedules:

- *April 1998 to June 1998*—A status description and a RI/FS overview will be included in the *INEEL Reporter,* a bi-monthly publication. Additional information may be included as the project progresses.

- *Date TBD*—A fact sheet that introduces background information on previous CERCLA investigations at WAGs 6 and 10 and the current OU 10-04 RI/FS will be distributed.

- *Date TBD*—The proposed plan will be distributed to individuals on the INEEL mailing list before the start of a 30-day public comment period. A fact sheet describing RI/FS results will be distributed before the proposed plan is submitted.

- *Date TBD*—A public meeting will be held to present the proposed plan and the FS results, and to provide the public an opportunity for discussion and comment. Opportunities for briefings, site tours, conference calls, and group discussions will be available upon request. A site tour of the INEEL areas or a briefing may be requested at anytime during the project.

- *Date TBD*—The RI/FS report, ROD, and other project documents will be available in the administrative record for public inspection as they are finalized and before finalization of the ROD. The ROD will include a responsiveness summary, in which comments submitted by the public will be addressed. Those who submit comments will receive a copy of the final ROD.

5.3 Field Investigations

Data collection and data development activities will be necessary to fill data gaps identified for OU 10-04 (see Section 4). The field investigation will focus on problem definition and, based on Agency comments during conference calls, will result in sufficient data to adequately define, evaluate, and decide on remedial action alternatives. The investigation approach is detailed in the FSPs for WAGs 6 and 10 (see Appendices F, G, and L).

5.3.1 WAGs 6 and 10 Waste Management

Waste generated during WAGs 6 and 10 activities will be appropriately managed under CERCLA. Waste from past WAGs 6 and 10 activities currently being dispositioned under CERCLA includes investigation derived waste (IDW) and CERCLA NTCRA waste from the OU 10-06 RI and NTCRA, and IDW from FY-97 OU 10-04 RI activities. Future WAGs 6 and 10 CERCLA waste may include nonhazardous and nonradioactive waste, hazardous and radioactive (mixed) waste, radioactive waste, and hazardous waste.

In general, waste management under CERCLA will include writing a hazardous waste determination (HWD, INEEL Form 0435.28) within 90 days of waste generation and before treatment or disposal of any solid waste. The signed HWDs for the past OU 10-06 and OU 10-04 activities mentioned above reside in the WAG 10 project files. Record keeping will be conducted in accordance with MCP-557, "Managing Records" (LMITCO Manual 1). Specific CERCLA waste management tasks will be documented in the appropriate field sampling plan and HWD, and, as appropriate in the OU 10-04 RI/FS, Proposed Plan, and ROD. Analytical laboratories will dispose of both altered and unaltered samples as contractually required. Nonhazardous, nonradioactive waste may be disposed under CERCLA as nonconditional cold waste at the CFA landfill complex. Mixed waste and hazardous waste may be dispositioned under CERCLA in accordance with regulations at an appropriate treatment, storage, and disposal facility. Nonhazardous, radioactive waste may be dispositioned under CERCLA at the on-Site RWMC or the Waste Experimental Reduction Facility (WERF). Individual waste streams destined for disposal at the RWMC or WERF will be approved and prepared for disposal in accordance with INEEL criteria (DOE-ID 1995; LMITCO 1996).

5.4 Sample Analysis and Data Validation

These tasks involve laboratory analysis and data validation. The methods and protocols that will be used in the analysis of samples collected at WAGs 6 and 10 are described in the FSPs (see Appendices F, G, and L). The SMO will validate the data to the levels of analytical method data validation called for in the FSPs, which are defined in TPR-79, "Levels of Method Validation." The analytical method data validation will be conducted in accordance with TPR-80, "Radiological Data Validation," TPR-132, "Inorganic and Miscellaneous Classical Analysis Data Evaluations," SMO-SOP-12.1.3, "Validation of Volatile Organic Gas Chromatography, and SMO-SOP-12.1.4, "Validation of Gas Chromatographic Data." Validated data are entered in the Integrated Environmental Data Management System (IEDMS) and uploaded to the Environmental Restoration Information System (ERIS).

5.5 Data Evaluation

Data collected during this RI and historical data will be evaluated and presented in maps, tables, graphs, and figures. The data will be logically organized to demonstrate relationships between site investigation results for each medium (i.e., ground water, perched water, soil, soil gas, and air). Data evaluation will include an assessment of accuracy, precision, completeness, comparability, and representativeness.

5.6 Contaminant Fate and Transport Modeling

5.6.1 WAG 6

Currently, no fate and transport modeling is planned for WAG 6 sites.

5.6.2 WAG 10

In 1994 WAG 10 workers published a report (McCarthy, et al., 1994) documenting a study conducted to develop a regional ground water flow model for the Eastern Snake River Plain Aquifer in the area of the INEEL. The WAG 10 model was developed to (a) support WAG 10, OU 10-04 ground water flow and transport studies, (b) support future transport modeling at the scale of the INEEL, (c) define the regional ground water flow setting for modeling ground water contaminant transport at the scale of the individual WAGs, (d) provide a tool for improving the understanding of the ground water flow system at the INEEL, and (e) consolidate the existing regional ground water modeling information into one usable model. To accomplish the modeling objectives, eight tasks were performed: (1) hydrogeologic data were complied, (2) hydrologic evaluation tools were developed to analyze hydraulic head and aquifer temperature data, (3) graphical tools were developed to easily modify the model inputs and evaluate the model output, (4) existing models were integrated to consolidate the existing regional ground water information, (5) the ground water model was calibrated, (6) sensitivity analysis was performed, (7) a WAG 10 data base was developed for all literature pertinent to WAG 10 ground water modeling, and (8) a source of information was established so modelers interested in modeling the regional ground water flow at the INEEL would have ready access to the codes developed, and the input and output files generated by the WAG 10 modeling effort.

McCarthy, et al., 1994 used the USGS code MODFLOWP, which is a transient, three-dimensional, finite difference ground water flow simulation code. The results of the WAG 10 study are archived and available through the Hydrological Data Repository maintained by WAG 10.

Since the publication of the WAG 10 modeling report, the individual WAGs have used the output files of the WAG 10 model as boundary conditions for their models. It is assumed that no aquifer contaminant fate and transport modeling will be performed for the WAG 10 RI/FS. WAG 10 will rely exclusively on models generated by WAGs 1 through 9 for assessing commingling of plumes on an INEEL-wide scale.

In an effort to evaluate issues associated with using model predictions from the individual WAGs and to develop this work plan, a preliminary superposition analysis was performed using available plume predictions (or plumes geometry's in the case of NRF). For this effort the only largest plumes (areal extent) from the individual WAGs were taken from modeling predictions, without remediation out to about 100 years into the future and plotted on a single map. Figure 5-1 shows the first cut at using the superposition approach for assessing plume commingling on an INEEL scale. It is important to note that the purpose of Figure 5-1 was to guide the development of this task in the work plan. It was based on readily available data only, and is not a final product. The following issues have been identified for using the superposition approach for evaluating plume commingling:

- In all cases, the leading edge of the largest plume for the individual WAGs fell outside the domain of the model. The shape of the leading edge of the plumes was estimated based upon the trajectory or rate of migration of the plume before the plume left the model domain. Therefore, the actual areas of plume overlap between WAGs fell outside the area modeled and well outside the area of focus for the modeling efforts.

- The vertical distribution or stratification within the aquifer is not considered with this two dimensional approach. For instance, it is possible, but not proven, that downward migration of contaminants from the INTEC toward the RWMC may take the contaminants to a depth such that commingling with CCl_4 at shallow depths is unlikely in a single well. Furthermore, if the contaminants will be deep enough at this location it may be unlikely a domestic well for the residential use scenario would be drilled deep enough to tap both zones and mix the contaminants.

- One hundred years was selected as the cutoff date for selecting the largest plumes. However, for many of the radionuclides the plumes are larger at longer projections (e.g., 2,800 years into the future for some INTEC plumes).

- Modifications of the models by the individual WAGs make this assessment obsolete (i.e., INTEC and RWMC are currently re-running their models at the time of this publication).

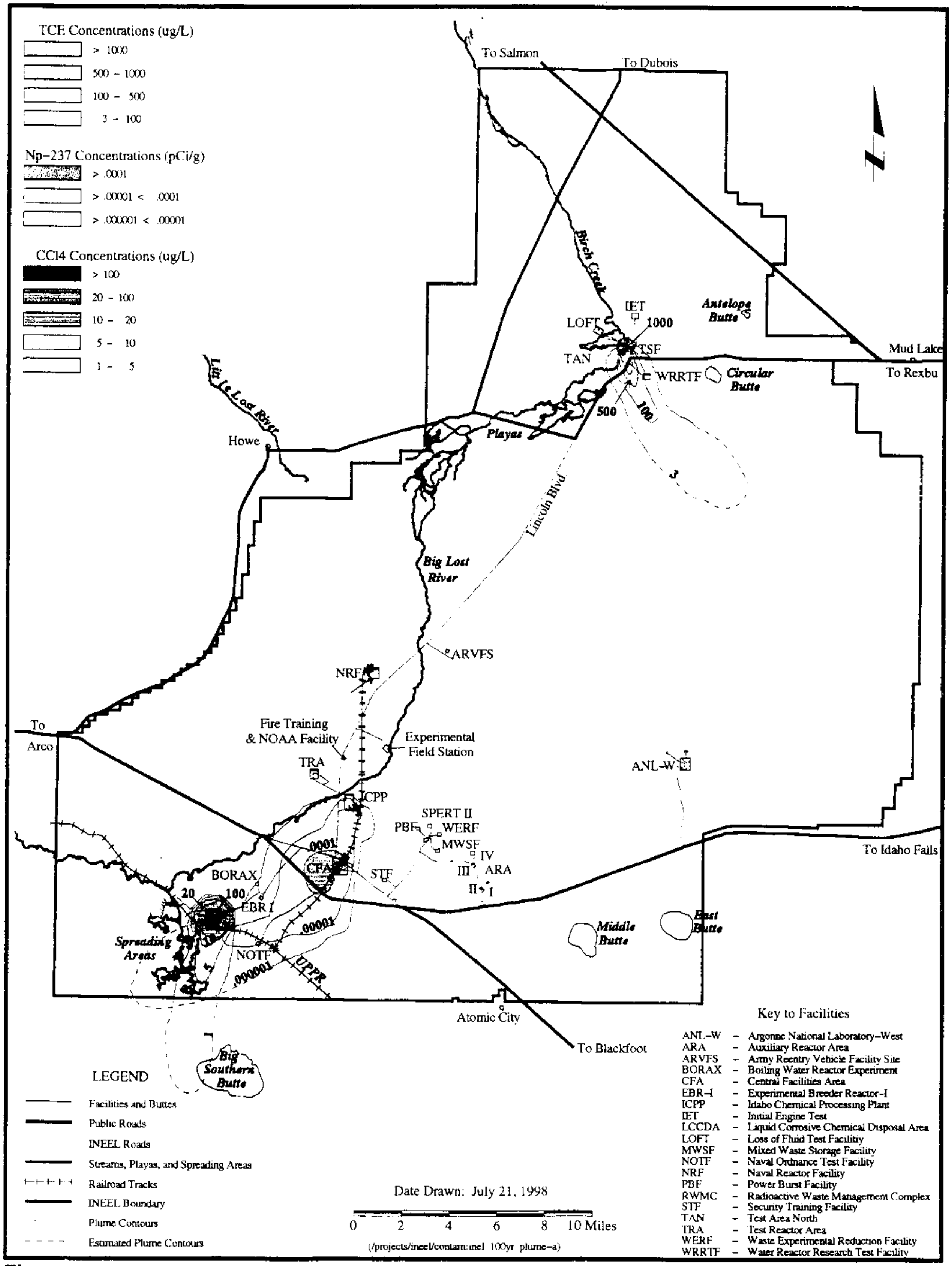

Figure 5-1. Predicted contaminant plume geometries in approximately 100 years for INEEL WAG specific RI/FS numerical simulations with no remediation.

- Not all of the models from the individual WAGS used the WAG 10 modeling results (i.e. WAG 1 modeling was performed prior to the WAG 10 modeling). Therefore, the regional flow fields are inconsistent.

- None of the WAG models take into account recent research that indicates that preferential "fast paths" may exist on the INEEL scale.

It is proposed that these issues will be addressed by other WAGs incorporating upgradient sources and more sophisticated flow modeling in their fate and transport simulations. For instance, the WAG 3 modeling included TRA or a source term and it is proposed that RWMC modeling include INTEC and TRA as upgradient sources. The primary activity for the OU 10-04 RI/FS will be to review and compile the results from the WAG models to ensure that site-wide contaminant issues have been addressed.

Currently, the only fate and transport modeling planned for WAG 10 is of 1,1,1 TCA from the OMRE site using GWSCREEN. This will be performed after more quantitative source term information is collected during proposed area ground water and soil sampling.

5.7 Baseline Risk Assessment

A BRA, along with the ARARs, will help guide decision making for developing RAOs. The BRA is conducted to determine whether the COCs at the site pose a current or future risk to human health and the environment. The risk assessment methodology is discussed in Sections 3.

5.8 Remedial Investigation Report

A RI report will summarize the nature and extent of contamination at WAGs 6 and 10 and present the results of the BRA and fate and transport modeling. The draft RI report, a secondary document as defined in the FFA/CO Action Plan, will support the RI/FS process, which selects the appropriate remedy for mitigating risk. The RI report will be prepared in accordance with the suggested RI report format presented in EPA guidance (EPA 1988).

The RI report will be revised after written comments on the draft RI report have been received from the EPA and IDHW. Written comment responses will be incorporated into the final comprehensive RI/FS report.

5.9 Remedial Alternatives Screening

The FS, if required, will address residual risk or regulatory needs at WAGs 6 and 10. The FS will document the procedure followed to develop, screen, and analyze remedial alternatives. A site-specific statement of purpose for a response (i.e., an evaluation of remedial alternatives through the FS process) will be prepared based on the results of the RI and the cumulative and comprehensive risk assessment. This statement will identify the actual or potential contamination sources and exposure pathways to be addressed by the remedial action alternatives.

These activities are outlined in Section 5.9.1. General response actions are further broken down into applicable technology types and process options in Subsection 5.9.2. The process of alternative development using general response actions is described in Subsection 5.9.3. Alternatives are screened in Subsection 5.9.4.

5.9.1 Remedial Action Objectives and General Response Actions

Remedial action objectives are media-specific or OU-specific goals for protecting human health and the environment. The RAOs will be based on the results of an initial analysis of ARARs, and a thorough evaluation of risks as indicated in the BRA. The RAOs will focus on protecting human health and the environment and will address the need to achieve specific contaminant concentrations and/or eliminate contaminant migration pathways.

Table 1-1 identifies contaminants of concern, FS data gaps, and potential remedial alternatives that are anticipated to be addressed in the OU 10-04 FS. Of the OU 10-04 sites retained, limited screening of remedial alternatives is anticipated, with a few exceptions. A majority of the retained sites will require only an additional risk evaluation for ecological or cumulative risk and are not anticipated to require additional data collection or remediation. Preferred alternatives have been identified for ordnance removal and groundwater remediation based on previous work performed. Results from the FY-98/99 OU 10-04 RDX/TNT treatability study for ex-situ biological degradation of soils contaminated with explosive materials will be incorporated in the OU 10-04 FS. Additionally, the Superfund Innovative Technologies Program (SITE) proposal will include plant uptake studies to be performed in support of the evaluation of phytoremediation of RDX/TNT contaminated soils. It is assumed the WAG-specific RI/FS RODs and RD/RA will be sufficient for remediation of the groundwater pathway, thus the OU 10-04 ROD will simply require continued institutional control with monitoring at the regional scale.

To facilitate screening of alternatives for retained OU 10-04 sites, they have been grouped based on contaminants of concern and anticipated remedial actions. The retained site groupings are detailed below and only represent those with identified data gaps. It is assumed that no data gaps are associated with those sites identified in Table 1-1 with the No Action or Institutional Controls (deed restrictions, physical barriers, site/waste monitoring, field surveillance) as the preferred alternate and therefore are not included in Table 5-1. It is also assumed that no scrap metal removal will be required at those ordnance sites that have not been retained for further evaluation in the OU 10-04 RI/FS.

Minimal RD/RA is anticipated to be implemented at OU 10-04 sites identified as exhibiting potential ecological risks in the OU 10-04 RI/FS. In respect to other WAGs with sites identified as posing unacceptable ecological risk not being addressed during their RD/RA, but having been retained in the OU 10-04 RI/FS for comprehensive aquifer and ecological evaluation, OU 10-04 would only address them in a RD/RA action to reduce ecological risks to acceptable levels at the site wide level. In the event the OU 10-04 ROD results in an RD/RA action to reduce site wide ecological risk at an individual WAG, the action would be conducted under OU 10-04 but would be coordinated with the specific WAG activities.

Note, the WAG 8 ROD is not planning to hand-off further evaluation to WAG 10 (per personal communication with Bruce Olenik).

Table 5-1. Anticipated remedial alternatives.

Site	FS Grouping	Contaminants of Potential Concern	Identified FS Data Gaps	Anticipated Remedial Alternatives
BORAX-09	Mixed Waste	Radionuclides Metals Organics	Availability of On Site Cover Material	No Action Institutional Controls Containment
EBR-15	Radioactive Soils	Radionuclides	Waste Acceptance Criteria Availability of On Site Cover Material	No Action Institutional Controls Containment Removal/On Site Disposal Removal/Off Site Disposal
EOCR-03	Hazardous Waste	Asbestos Metals	Waste Acceptance Criteria Nature and Extent Availability of On site Cover Material	No Action Institutional Controls Containment Excavation/On Site Disposal Excavation/Off Site Disposal
OMRE	Mixed Waste	Radionuclides Organics	Soil Moisture Grain Size Distribution Waste Acceptance Criteria Availability of On site Cover Material Nature and Extent	No Action Institutional Controls Containment Ex-situ Treatment Excavation/On Site Disposal Excavation/Off Site Disposal
STF-01	Mixed Waste	Asbestos Organics Radionuclides	Waste Acceptance Criteria Soil Moisture Grain Size Distribution	No Action Institutional Controls Excavation/On Site Disposal Excavation/Off Site Disposal
STF Gun Range	Hazardous Waste	Metals Organics	Soil Moisture Grain Size Distribution Waste Acceptance Criteria	No Action Institutional Controls Ex-situ Treatment Excavation/On Site Disposal Excavation/Off Site Disposal
ORD-06	Ordnance and contaminated soils	UXO TNT TPH Organics Pesticides Acids Nitrates/Nitrites	Soil Moisture Grain Size Distribution pH Waste Acceptance Criteria Nature and Extent	No Action Institutional Controls Bioremediation Incineration Removal/Detonation/On Site Disposal Removal/Detonation/Off Site Disposal
ORD-08	Contaminated soils	UXO Compounds	Soil Moisture pH Waste Acceptance Criteria Nature and Extent	No Action Institutional Controls Bioremediation Incineration
ORD-10	Contaminated soils	UXO Compounds	Soil Moisture pH Waste Acceptance Criteria Nature and Extent	No Action Institutional Controls Bioremediation Incineration
ORD-13	Ordnance and contaminated	UXO TNT	Soil Moisture pH	No Action Institutional Controls

Table 5-1. (continued).

Site	FS Grouping	Contaminants of Potential Concern	Identified FS Data Gaps	Anticipated Remedial Alternatives
	soils		Waste Acceptance Criteria Nature and Extent	Bioremediation Incineration Removal/Detonation/On Site Disposal Removal/Detonation/Off Site Disposal
ORD-15	Contaminated Soils	TNT	Soil Moisture pH Waste Acceptance Criteria Nature and Extent	No Action Institutional Controls Bioremediation Incineration
ORD-16	Contaminated Soils	UXO Compounds	Soil Moisture pH Waste Acceptance Criteria Nature and Extent	No Action Institutional Controls Bioremediation Incineration
ORD-17	Contaminated Soils	UXO Compounds	Soil Moisture pH Waste Acceptance Criteria Nature and Extent	No Action Institutional Controls Bioremediation Incineration
ORD-19	Ordnance and Contaminated Soils	UXO	Soil Moisture pH Waste Acceptance Criteria Nature and Extent	No Action Institutional Controls Bioremediation Removal/Detonation/On Site Disposal Removal/Detonation/Off Site Disposal
ORD-24	Ordnance and Contaminated Soils	UXO	Soil Moisture pH Waste Acceptance Criteria Nature and Extent	No Action Institutional Controls Bioremediation Incineration Removal/Detonation/On Site Disposal Removal/Detonation/Off Site Disposal
ORD-28	Contaminated Soils	TNT	Soil Moisture pH Waste Acceptance Criteria Nature and Extent	No Action Institutional Controls Bioremediation Incineration

5.9.2 Preliminary Remedial Process Options

5.9.2.1 Appropriate Process Options. The FS process will include a screening of appropriate process options available to address residual contamination that poses unacceptable risks at WAGs 6 and 10. Process options may be categorized into various technology types. The process options are grouped into the general response actions given below.

No Action—The general response action of No Action would be considered as a baseline against which developed alternatives would be compared. No Action at the INEEL generally includes the institutional action of long-term monitoring.

Institutional Controls—Institutional controls include actions that prevent or limit access to contaminated areas through the period of time that DOE controls WAGs 6 and 10. Institutional controls also may extend beyond the period in which DOE maintains control of WAGs 6 and 10; however, another agency, such as the BLM, may take over the administration of institutional controls. Institutional controls include monitoring, administrative procedures, deed restrictions, fences or other barriers, signs, and security. Past INEEL remedial action decisions that employ only institutional controls are referred to as limited action decisions.

Containment—Containment, often the preferred method of dealing with sites where treatment is impractical, may reduce the risk to acceptable levels without removing contaminants from the site. Containment includes process options such as capping, grout curtains, and sheet pilings designed to isolate contaminants and prevent their migration beyond the containment boundaries. Experience and data collected from other contaminated sites will be used to guide the development and evaluation of any alternatives that include the general response action of containment.

In Situ Treatment—In situ treatment process options include treatment technologies such as biotreatment, soil flushing, vapor extraction, and vitrification. The in situ treatment options would be integrated into alternatives that focus on reducing the toxicity, mobility, or volume of contaminants without removal.

Ex Situ Treatment—Ex situ treatment process options would require removing contaminants from their current location and treating them to reduce their toxicity, mobility, or volume. Ex situ treatment options could include processes such as soil washing, thermal desorption, vitrification, and oxidation/reduction. Treated materials can either be returned to their original location or transported to a new location.

Excavation or Disposal On-Site or Off-Site—This general response action includes process options for removing contaminated media. Once removed, materials would be packaged for disposal in an engineered facility located either on-Site or off-Site, possibly after some type of ex situ treatment.

5.9.2.2 Screening of Process Options. The master list of preliminary process options supporting the selected general response actions for OU 10-04 will be screened to eliminate clearly unsuitable process options. The process option screening will be based on effectiveness, implementability, and cost.

Specific process options will be evaluated for their effectiveness in achieving the RAOs. This evaluation will focus on:

- The potential effectiveness of process options in handling the estimated volumes of contaminants in specific environmental media and meeting the remediation goals identified in the RAOs

- The potential impacts to human health and the environment during the construction and implementation phase

- The reliability of the process with respect to remediation of the contaminants and site conditions.

Implementability encompasses both the technical and administrative feasibility of implementing a process option. Technical implementability is used as an initial screen of process options to eliminate those that are clearly ineffective or unworkable at a site. Administrative implementability, namely the availability of treatment, storage, and disposal services including capacity, equipment, and skilled workers, are considered during the detailed analysis of alternatives.

Cost is a factor in the screening of process options. Relative capital and operation and maintenance costs are used rather than detailed estimates. At this stage, the cost analysis is based on engineering judgment and past experience. The cost of each process is evaluated to determine whether costs are high, low, or medium compared with process options of the same technology type.

Elimination of any process option during the screening process will be fully documented in the final FS report.

5.9.3 Development of Alternatives

Alternatives will be developed that protect human health and the environment by eliminating, reducing, or controlling risks posed by the site. General response actions and the process options chosen to represent the various technology types for each medium are combined to form alternatives for WAGs 6 and 10 as a whole. Often, more than one general response action will be applied to each medium.

5.9.4 Threshold and Balancing Criteria

Alternatives will be screened based on the short- and long-term aspects of their effectiveness, implementability, and cost. To the extent practicable, a wide range of alternatives will be preserved.

5.9.4.1 Effectiveness. An essential aspect of the screening evaluation is the effectiveness of each alternative in protecting human health and the environment. Each alternative developed will be evaluated for its effectiveness to provide protection and reduce of toxicity, mobility, or volume. Both short- and long-term components of effectiveness will be evaluated. Short-term effectiveness refers to the period until the remedial action is complete. Long-term effectiveness refers to controls that may be required to manage the risk posed by treatment residuals, untreated water, and any contamination left at a site. Reduction of toxicity, mobility, or volume refers to changes in one or more characteristics of the radiological or chemical compounds or contaminated media resulting from a treatment that decreases the inherent threats or risks associated with the contamination.

5.9.4.2 Implementability. Implementability is a measure of the technical and administrative feasibility of constructing, operating, and maintaining a remedial action alternative. Technical feasibility is the ability to construct, reliably operate, and meet technology-specific regulations for process options. Administrative feasibility refers to the ability to obtain approvals from agencies availability of treatment, storage and disposal services (and capacity) and the requirements for and availability of specific equipment and technical specialists.

5.9.4.3 Cost. A cost estimate for each alternative will be prepared. The estimate of capital and operations and maintenance costs will be considered, where appropriate, during the screening of alternatives. The evaluation will include those operation and maintenance costs that will be incurred for as long as necessary, even after the initial remedial action is complete. In addition, potential future remedial action costs will be considered during alternative screening to the extent that they can be defined. Present worth analyses will be used during alternative screening to evaluate expenditures that occur over different time periods.

5.9.4.4 Selection of Alternatives for Detailed Analysis. The list of candidate alternatives will be narrowed to those that reduce risk to the public and the environment and are technically feasible. The identified process options will be evaluated and screened based on effectiveness, implementability, and cost.

The results of the screening process will be reviewed by DOE-ID, EPA, and the State of Idaho. This review will result in an agreed-upon set of alternatives that will undergo detailed analysis.

5.10 Detailed Analysis of Alternatives

A detailed analysis of alternatives is a range of remedial alternatives that represent distinct, viable approaches to addressing residual risks at WAGs 6 and 10. A No Action alternative will serve as a baseline for comparison to the action alternatives. Alternatives remaining after the screening process discussed in Subsection 5.9.4 will be thoroughly analyzed. The detailed analysis will consist of an assessment of individual alternatives compared to the nine evaluation criteria discussed below. A comparative analysis will then focus on the relative performance of each alternative against the criteria.

The nine evaluation criteria are categorized into three groups: (1) threshold criteria, (2) primary balancing criteria, and (3) modifying criteria. The first two criteria, "Overall Protection of Human Health and the Environment" and "Compliance with ARARs," are the threshold criteria that must be met in order for an alternative to be eligible for selection. The third through seventh criteria are the primary balancing criteria that compare the relative tradeoffs among the alternatives. The last two criteria are the modifying criteria and will be addressed in the ROD following public comment on the comprehensive RI/FS report and proposed plan.

5.10.1 Overall Protection of Human Health and the Environment

Alternatives will be assessed to determine whether they adequately protect human health and the environment by eliminating, reducing, or controlling risks.

5.10.2 Compliance with ARARs

The alternatives will be assessed to determine whether they meet federal and state ARARs. The FS will acknowledge those alternatives that would require an ARAR waiver under 40 CFR 300.430 (f)(1)(ii)(C) in order to be the proposed remedial alternative.

5.10.3 Long-Term Effectiveness and Permanence

Alternatives will be assessed to determine the long-term effectiveness and permanence they afford, along with the likelihood of success of each alternative. Factors affecting long-term permanence and effectiveness include:

- The residual risk assessment for each alternative to evaluate the cumulative effects of both long-term and short-term risks associated with the implementation of the remedial alternative
- The type, degree, and adequacy of long-term management required, including engineering controls, institutional controls, monitoring, operation, and maintenance
- Long-term reliability of controls, including uncertainties associated with land disposal of untreated hazardous waste and treatment residuals
- The potential needs to provide a substitute for the remedy.

5.10.4 Reduction of Toxicity, Mobility, and Volume

The degree to which alternatives employ treatments that reduce toxicity, mobility, and volume will be assessed, based on the following considerations:

- The type of process options employed for the alternatives and which materials they will treat
- The amount of contamination that will be destroyed or treated
- The degree of expected reduction in toxicity, mobility, and volume
- The degree to which the treatment is reversible
- Residuals that will remain and by-products that will be created following treatment.

5.10.5 Short-Term Effectiveness

Assessment of short-term effectiveness of alternatives will consider:

- Possible short-term risks to the community during implementation of an alternative
- Potential impacts on workers conducting remedial actions and the effectiveness and reliability of protective measures
- Potential environmental impacts of remedial actions and the effectiveness and reliability of mitigative measures during implementation
- The time until protection is achieved.

5.10.6 Implementability

Assessment of the ease or difficulty of implementing the alternatives will be considered based on the following:

- Degree of difficulty or uncertainty associated with construction and operation of the technology
- Expected operational reliability and the ability to undertake additional action, if required
- Ability and time required to obtain necessary approvals and permits from applicable agencies
- Availability of necessary equipment and specialists
- Available capacity and location of needed treatment, storage, and disposal services
- Timing of the availability of prospective technologies that may be under development.

5.10.7 Costs

Costs will be estimated, including capital and operation and maintenance costs, based on present value. The costs will be developed with an accuracy of +50 to -30% (EPA 1988) unless otherwise stated in the FS.

5.10.8 State Acceptance

Concerns identified by the Idaho Department of Health and Welfare (IDHW) during its review of the comprehensive RI/FS, work plan, RI/FS proposal plan, and ROD will be assessed. The review will consider the proposed use of waivers, the selection process used to evaluate alternatives, and other actions. Comments received from the state will be incorporated into the remedial evaluation.

5.10.9 Community Acceptance

Community response to the alternatives will be assessed. Similar to the State's acceptance criteria, complete assessment will not be possible until comments on the proposed action have been received. The process for public involvement is discussed in Subsection 5.2.

5.11 Remedial Investigation/Feasibility Study Report

The comprehensive RI/FS report will summarize the results of previous field investigations, treatability studies, ARAR analyses, comprehensive and cumulative risk assessments, and remedial alternatives. The comprehensive RI//FS report is defined as a primary document in the action plan. The comprehensive RI/FS report will serve as a basis for consolidating information and documenting the rationale used to screen and develop remedial actions associated with WAGs 6 and 10. The comprehensive RI/FS report will contain the information needed by the decision-makers to select an appropriate remedy for OU 10-04. The elements of the comprehensive RI/FS report will follow the basic format presented in the EPA 1988. Supporting data, information, and calculations will be included in the appendices to the report. The document will be revised per the comments received and submitted to

DOE-ID, EPA, and IDHW for review. Written comments on the draft comprehensive RI/FS from EPA and IDHW will be addressed in the final comprehensive RI/FS report.

5.12 Proposed Plan and Record of Decision

This task includes the preparation of a proposed plan and ROD. The proposed plan, a secondary document as defined in the action plan, will be prepared to facilitate public participation in the remedy selection process. After the comprehensive RI/FS report is compiled, the proposed plan for OU 10-04 will be presented to the public. The proposed plan will outline the proposed remediation plans developed and supported by the OU 10-04 RI/FS activities. The proposed plan will be written in accordance with the format recommended in EPA guidance (EPA 1988). Any issues raised during the public comment period will be addressed in the responsiveness summary of the ROD.

Public involvement in the decision process is vital to the successful implementation of a remediation alternative. Public participation in the decision process will be conducted according to the CRP and EPA guidance (EPA 1988).

After agency and public comments are resolved and the comprehensive RI/FS report and proposed plan are completed, a remedy for OU 10-04 will be selected and documented in the ROD, which will be signed by the parties specified in the FFA/CO. The ROD will be prepared in accordance with EPA guidance (EPA 1988) and will serve the following four functions:

1. Certify that the remedy selection process was carried out in accordance with the FFA/CO, CERCLA, and the NCP

2. Describe the technical parameters and goals of the remedy, specifying the treatment, engineering, and institutional components

3. Provide the public with a consolidated source of information about the site and the chosen remedy, including the rationale behind the selection

4. Delineate post-ROD activities such as scoping the remediation, developing the remedial action plan, and monitoring.

5.13 Enforcement Aspects

Enforcement activities include preparation of briefing materials, meeting attendance, and task management and quality control functions.

5.14 Administrative Support

An administrative record file will be maintained for the OU 10-04 RI/FS. The administrative record is a collection of project documents required by CERCLA, in addition to other technical and legal documents and correspondence. The official administrative record is located at the INEEL Technical Library in Idaho Falls, Idaho. Copies of documents in the administrative record file are also located in information repositories in the Boise INEEL Office, the Marshall Public Library in Pocatello, and the Shoshone-Bannock Library in Fort Hall. Select copies of Superfund-related documents are also located in public libraries in Idaho Falls, Twin Falls, and Boise.

5.15 References

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6. ENFORCEABLE SCHEDULE

The WAG 10 schedule was originally established in the FFA/CO (DOE 1991), accelerated in the *OU 10-04 Scope of Work* (SOW) (DOE 1997), decelerated in 1997, through consensus with DOE-ID, EPA, and IDHW, and is now being renegotiated. Two major issues—WAG 10 scope and WAG 10 integration with other WAGs—have resulted in the need to change the OU 10-04 RI/FS schedule.

The FFA/CO (DOE 1991) described WAG 10 as a "safety net," called the OU 10-04 RI/FS the "blanketing" INEEL-wide cumulative RI/FS, and specified that the OU 10-04 RI/FS would follow all other INEEL WAG-specific RI/FSs. Because the scope of the other WAG-specific RI/FSs increased, the scope of the OU 10-04 RI/FS decreased to the point where qualitative cumulative ground water and ecological assessments were needed in the OU 10-04 RI/FS. As a result, the WAG 10 working schedule was accelerated in the SOW two years ahead of the FFA/CO schedule (DOE 1997). The issues and critical assumptions associated with the acceleration of the OU 10-04 RI/FS schedule are detailed in the *Operable Unit (OU) 10-04 Groundwater Strategy Assessment Technical Memorandum* (INEL 1996a) and *Approach and Data Gap Identification for OU 10-04 INEL-Wide Ecological Risk Assessment Technical Memorandum* (INEL 1996b), and the issues and critical assumptions are included in Appendix F of the SOW (DOE 1997).

One problem with the accelerated OU 10-04 RI/FS schedule was that the OU 10-04 RI/FS comprehensive assessments were still depending on data from the WAG-specific comprehensive RI/FSs and these data were not expected to become available in time. Ideally, the WAG-specific draft RI/BRAs would be available to support the draft OU 10-04 Scope of Work and the WAG-specific final RODs would be available to support the draft OU 10-04 RI/FS report. To accommodate data from the WAGs and allow collection of OU 10-04 RI/FS data in FY-97, consensus was reached between DOE-ID, EPA, and IDHW to decelerate the OU 10-04 RI/FS schedule.

However, since the time of the 1997 deceleration, the schedules of some WAG-specific RI/FSs have been extended and the OU 10-04 RI/FS schedule is again in negotiation. In addition, the other WAG schedules are still subject to change.

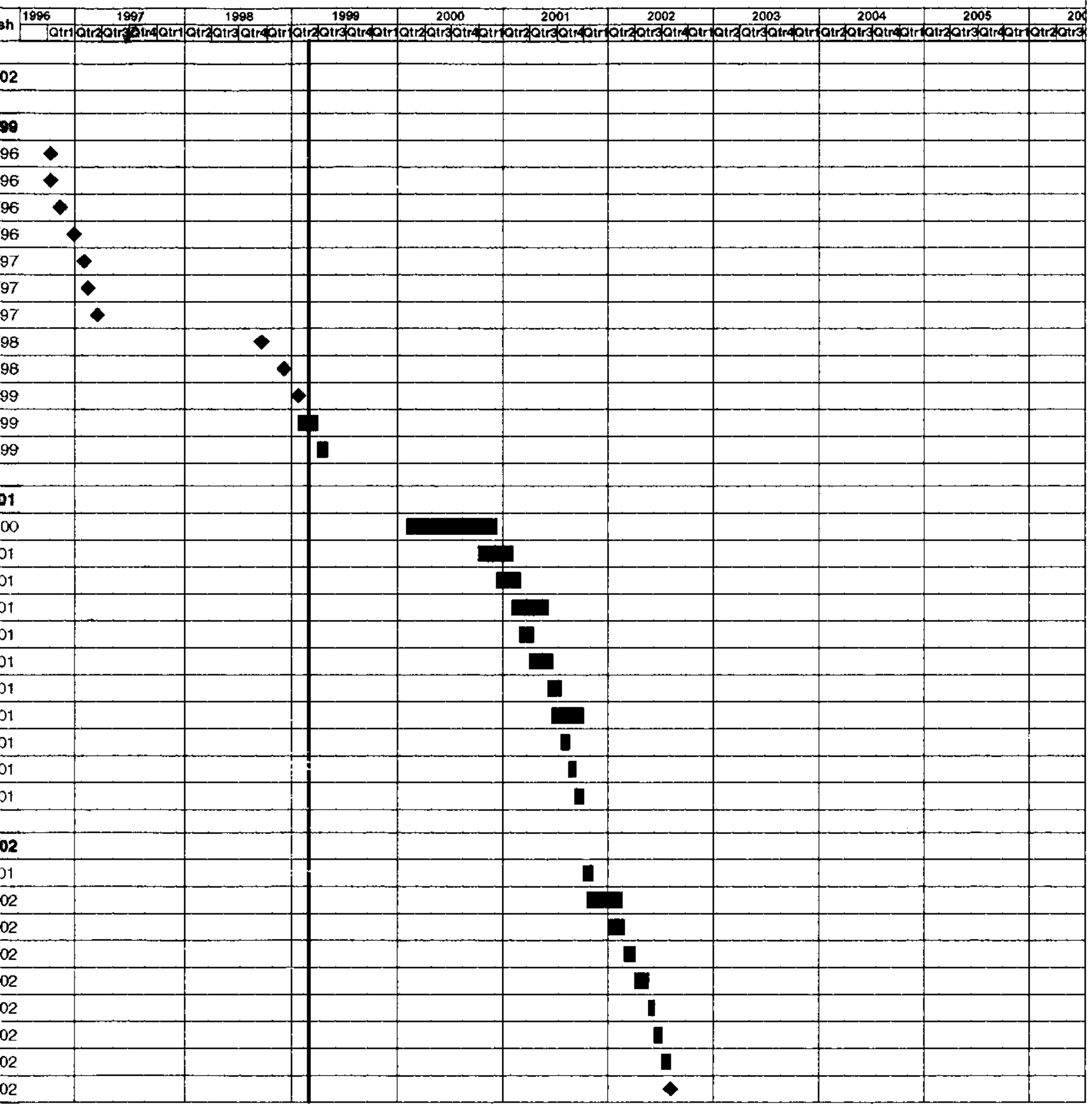
The current consensus for developing the OU 10-04 RI/FS while allowing time to incorporate data from other WAGs is to split the OU 10-04 RI/FS into two parts; OU 10-04 and OU 10-08. OU 10-04 will include an evaluation of the risks and remedial alternatives for all of the OU 6/10 sites, an evaluation of the risks and remedial alternatives for the Security Training Facility, an evaluation of sitewide ecological risks and remedial alternatives, an evaluation of risks and remedial alternatives for the ordnance sites, and an evaluation of the Native American Scenario. OU 10-08 will include an evaluation of sitewide groundwater concerns and an evaluation of sites that are passed to WAG 10 by other WAGs and sites that are discovered after the OU 10-04 Work Plan is signed.

Figures 6-1 and 6-2 and Tables 6-1 and 6-2 present the enforceable schedules for OU 10-04 and OU 10-08. The OU 10-04 schedule has been delayed one year from the FFA/CO schedule to allow time for conducting two field seasons of characterization at OMRE, conducting one field season of characterization at STF, developing the sitewide ERA methodology, and developing information that will be incorporated in the Native American scenario analysis.

The OU 10-08 schedule is tied to the OU 7-13/14 ROD schedule. As a result, if the OU 7 13/14 ROD schedule slips, the OU 10-08 schedule will slip by the same amount. Additional issues related to the OU 10-04 RI/FS schedule are discussed in Section 4. The working schedules for all of the INEEL comprehensive RI/FS investigations are shown in Figure 6-3.

OU 10-04 Comprehensive RI/FS Working Schedule

Task #	Task Description	Duration	Early Start	Early Finish
OU 10-04 Comprehensive RI/FS Working Schedule				
		1473d	11/Oct/96	31/Jul/02
Scoping Process				
		658d	**11/Oct/96**	**30/Apr/99**
1	Start OU 10-04 Comprehensive RI/FS Working Schedule	0d	11/Oct/96	11/Oct/96
3	OU 10-04 Draft RI/FS SOW Sent to DOE-ID for Review	0d	11/Oct/96	11/Oct/96
4	OU 10-04 Draft RI/FS SOW Submitted by DOE-ID to EPA/IDHW for Review and Comment	0d	13/Nov/96	13/Nov/96
5	OU 10-04 Draft RI/FS SOW Comments Sent by EPA and IDHW to DOE-ID	0d	30/Dec/96	30/Dec/96
6	OU 10-04 Draft Final RI/FS SOW Submitted to DOE-ID for Review and Comment	0d	30/Jan/97	30/Jan/97
7	OU 10-04 Draft Final RI/FS SOW Submitted by DOE-ID to EPA and IDHW for Review and Comment	0d	13/Feb/97	13/Feb/97
8	OU 10-04 RI/FS SOW Becomes Final - Sent by DOE-ID to Administrative Record & Document Control (ARDC)	0d	17/Mar/97	17/Mar/97
9	OU 10-04 Draft RI/FS Work Plan Sent to DOE-ID for Review	0d	14/Sep/98	14/Sep/98
10	OU 10-04 Draft RI/FS Work Plan Submitted by DOE-ID to EPA/IDHW for Review and Comment	0d	30/Nov/98	30/Nov/98
11	OU 10-04 Draft RI/FS Work Plan Comments Sent by EPA and IDHW to DOE-ID	0d	25/Jan/99	25/Jan/99
12	OU 10-04 Draft Final RI/FS Work Plan Sent by DOE-ID to EPA and IDHW for Review and Comment	48d	25/Jan/99	31/Mar/99
13	OU 10-04 RI/FS Work Plan Becomes Final - Sent by DOE-ID to ARDC	23d	31/Mar/99	30/Apr/99
Implementation				
		420d	**01/Feb/00**	**28/Sep/01**
15	OU 10-04 Draft RI/BRA Sent to DOE-ID for Review	214d	01/Feb/00	01/Dec/00
17	OU 10-04 Draft RI/FS Report Sent to DOE-ID for Review	81d	02/Oct/00	01/Feb/01
16	OU 10-04 Draft RI/BRA Submitted by DOE-ID to EPA/IDHW for Review and Comment	58d	01/Dec/00	28/Feb/01
19	OU 10-04 Draft RI/FS Report Submitted by DOE-ID to EPA and IDHW for Review and Comment	86d	01/Feb/01	01/Jun/01
18	OU 10-04 Draft RI/RBA Comments Sent by EPA and IDHW to DOE-ID	33d	28/Feb/01	13/Apr/01
24	OU 10-04 Draft RI/FS Proposed Plan Sent to DOE-ID for Review	54d	02/Apr/01	15/Jun/01
20	OU 10-04 Draft RI/FS Report Comments Sent by EPA and IDHW to DOE-ID	32d	01/Jun/01	17/Jul/01
25	OU 10-04 Draft RI/FS Proposed Plan Submitted by DOE-ID to EPA/IDHW for Review and Comment	74d	15/Jun/01	28/Sep/01
21	OU 10-04 Draft Final RI/FS Report Sent to DOE-ID for Review	19d	17/Jul/01	10/Aug/01
22	OU 10-04 Draft Final RI/FS Report Sent by DOE-ID to EPA and IDHW for Approval	16d	10/Aug/01	31/Aug/01
23	OU 10-04 Draft RI/FS Report Becomes Final - Sent by DOE-ID to ARDC	20d	31/Aug/01	28/Sep/01
Decision Process				
		209d	**28/Sep/01**	**31/Jul/02**
27	OU 10-04 RI/FS Proposed Plan Comments Sent by EPA and IDHW to DOE	24d	28/Sep/01	31/Oct/01
28	OU 10-04 RI/FS Proposed Plan Public Comment Period Begins	83d	12/Oct/01	15/Feb/02
29	OU 10-04 Draft RI/FS ROD Sent to DOE-ID for Review	39d	02/Jan/02	25/Feb/02
30	OU 10-04 Draft RI/FS ROD Submitted by DOE-ID to EPA/IDHW for Review and Comment	26d	25/Feb/02	01/Apr/02
31	OU 10-04 Draft RI/FS ROD Comments Sent by EPA and IDHW to DOE-ID	33d	01/Apr/02	15/May/02
32	OU 10-04 Draft Final RI/FS ROD Sent to DOE-ID for Review	15d	15/May/02	05/Jun/02
33	OU 10-04 Draft Final RI/FS ROD Sent by DOE-ID to EPA and IDHW for Approval	19d	05/Jun/02	01/Jul/02
34	OU 10-04 Draft RI/FS ROD Becomes Final	22d	01/Jul/02	31/Jul/02
35	Finish OU 10-04 Comprehensive RI/FS Working Schedule	0d	31/Jul/02	31/Jul/02



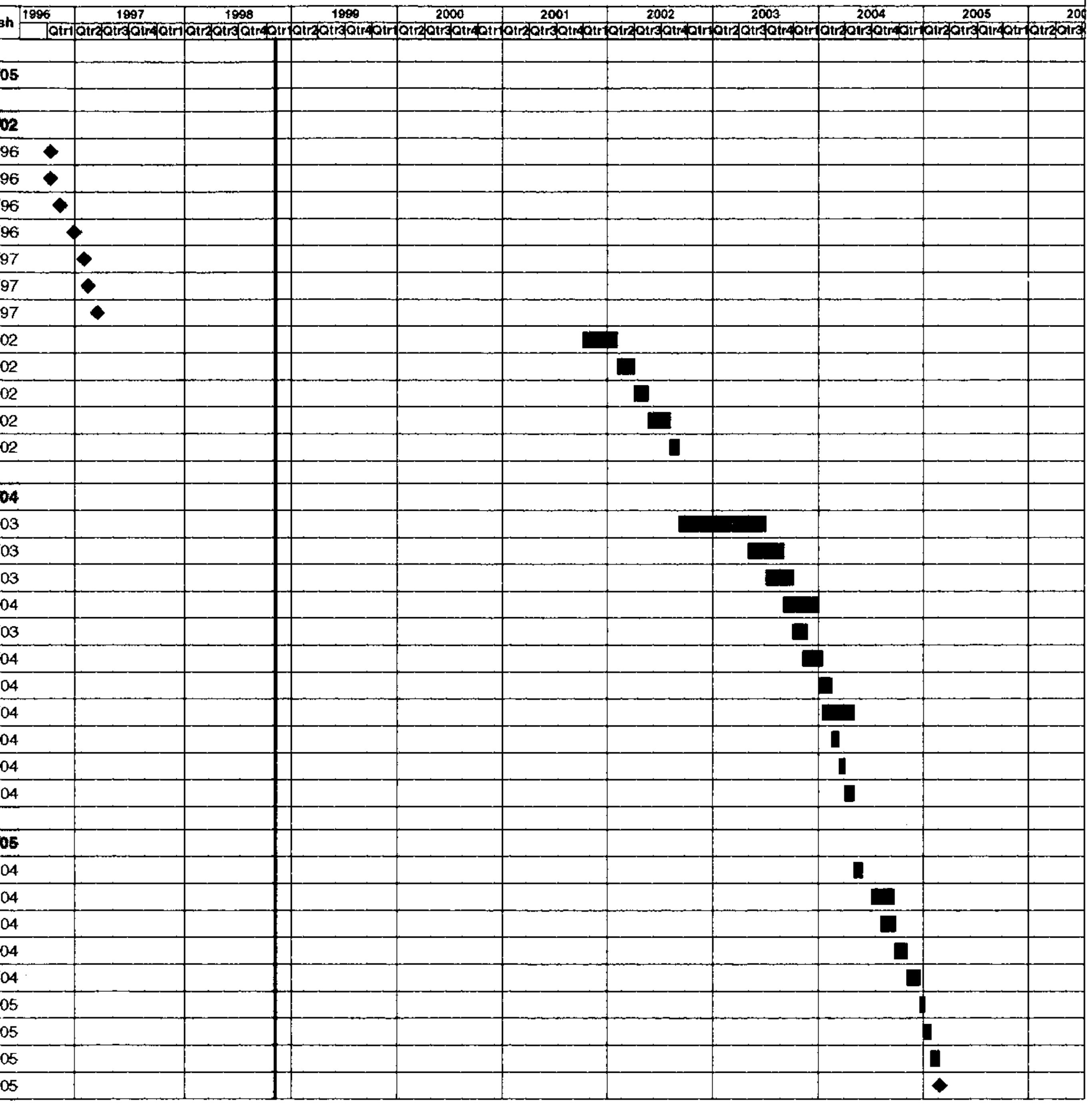
Default

Complete | Complete Milestone | Remaining | Remaining Milestone

Figure 6.1 Working schedule for the OU 10-04 RI/FS.

OU 10-08 Comprehensive RI/FS Working Schedule

Task #	Task Description	Duration	Early Start	Early Finish
	OU 10-08 Comprehensive RI/FS Working Schedule			
		2115d	**11/Oct/96**	**28/Feb/05**
	Scoping Process			
		1495d	**11/Oct/96**	**30/Aug/02**
1	Start OU 10-08 Comprehensive RI/FS Working Schedule	0d	11/Oct/96	11/Oct/96
3	OU 10-08 Draft RI/FS SOW Sent to DOE-ID for Review	0d	11/Oct/96	11/Oct/96
4	OU 10-08 Draft RI/FS SOW Submitted by DOE-ID to EPA/IDHW for Review and Comment	0d	13/Nov/96	13/Nov/96
5	OU 10-08 Draft RI/FS SOW Comments Sent by EPA and IDHW to DOE-ID	0d	30/Dec/96	30/Dec/96
6	OU 10-08 Draft Final RI/FS SOW Submitted to DOE-ID for Review and Comment	0d	30/Jan/97	30/Jan/97
7	OU 10-08 Draft Final RI/FS SOW Submitted by DOE-ID to EPA and IDHW for Review and Comment	0d	13/Feb/97	13/Feb/97
8	OU 10-08 RI/FS SOW Becomes Final - Sent by DOE-ID to Administrative Record & Document Control (ARDC)	0d	17/Mar/97	17/Mar/97
9	OU 10-08 Draft RI/FS Work Plan Sent to DOE-ID for Review	82d	01/Oct/01	01/Feb/02
10	OU 10-08 Draft RI/FS Work Plan Submitted by DOE-ID to EPA/IDHW for Review and Comment	42d	01/Feb/02	01/Apr/02
11	OU 10-08 Draft RI/FS Work Plan Comments Sent by EPA and IDHW to DOE-ID	33d	01/Apr/02	15/May/02
12	OU 10-08 Draft Final RI/FS Work Plan Sent by DOE-ID to EPA and IDHW for Review and Comment	54d	15/May/02	31/Jul/02
13	OU 10-08 RI/FS Work Plan Becomes Final - Sent by DOE-ID to ARDC	23d	31/Jul/02	30/Aug/02
	Implementation			
		416d	**30/Aug/02**	**30/Apr/04**
15	OU 10-08 Draft RI/BRA Sent to DOE-ID for Review	207d	30/Aug/02	30/Jun/03
17	OU 10-08 Draft RI/FS Report Sent to DOE-ID for Review	86d	30/Apr/03	29/Aug/03
16	OU 10-08 Draft RI/BRA Submitted by DOE-ID to EPA/IDHW for Review and Comment	65d	30/Jun/03	30/Sep/03
19	OU 10-08 Draft RI/FS Report Submitted by DOE-ID to EPA and IDHW for Review and Comment	83d	28/Aug/03	02/Jan/04
18	OU 10-08 Draft RI/RBA Comments Sent by EPA and IDHW to DOE-ID	34d	30/Sep/03	14/Nov/03
24	OU 10-08 Draft RI/FS Proposed Plan Sent to DOE-ID for Review	47d	31/Oct/03	15/Jan/04
20	OU 10-08 Draft RI/FS Report Comments Sent by EPA and IDHW to DOE-ID	32d	02/Jan/04	16/Feb/04
25	OU 10-08 Draft RI/FS Proposed Plan Submitted by DOE-ID to EPA/IDHW for Review and Comment	77d	15/Jan/04	30/Apr/04
21	OU 10-08 Draft Final RI/FS Report Sent to DOE-ID for Review	19d	16/Feb/04	11/Mar/04
22	OU 10-08 Draft Final RI/FS Report Sent by DOE-ID to EPA and IDHW for Approval	15d	11/Mar/04	31/Mar/04
23	OU 10-08 Draft RI/FS Report Becomes Final - Sent by DOE-ID to ARDC	23d	31/Mar/04	30/Apr/04
	Decision Process			
		208d	**30/Apr/04**	**28/Feb/05**
27	OU 10-08 RI/FS Proposed Plan Comments Sent by EPA and IDHW to DOE	21d	30/Apr/04	31/May/04
28	OU 10-08 RI/FS Proposed Plan Public Comment Period Begins	54d	30/Jun/04	15/Sep/04
29	OU 10-08 Draft RI/FS ROD Sent to DOE-ID for Review	35d	02/Aug/04	20/Sep/04
30	OU 10-08 Draft RI/FS ROD Submitted by DOE-ID to EPA/IDHW for Review and Comment	30d	20/Sep/04	29/Oct/04
31	OU 10-08 Draft RI/FS ROD Comments Sent by EPA and IDHW to DOE-ID	32d	29/Oct/04	15/Dec/04
32	OU 10-08 Draft Final RI/FS ROD Sent to DOE-ID for Review	13d	15/Dec/04	10/Jan/05
33	OU 10-08 Draft Final RI/FS ROD Sent by DOE-ID to EPA and IDHW for Approval	16d	10/Jan/05	31/Jan/05
34	OU 10-08 Draft RI/FS ROD Becomes Final	21d	31/Jan/05	28/Feb/05
35	Finish OU 10-08 Comprehensive RI/FS Working Schedule	0d	28/Feb/05	28/Feb/05



Default

Complete · Complete Milestone · Remaining · Remaining Milestone

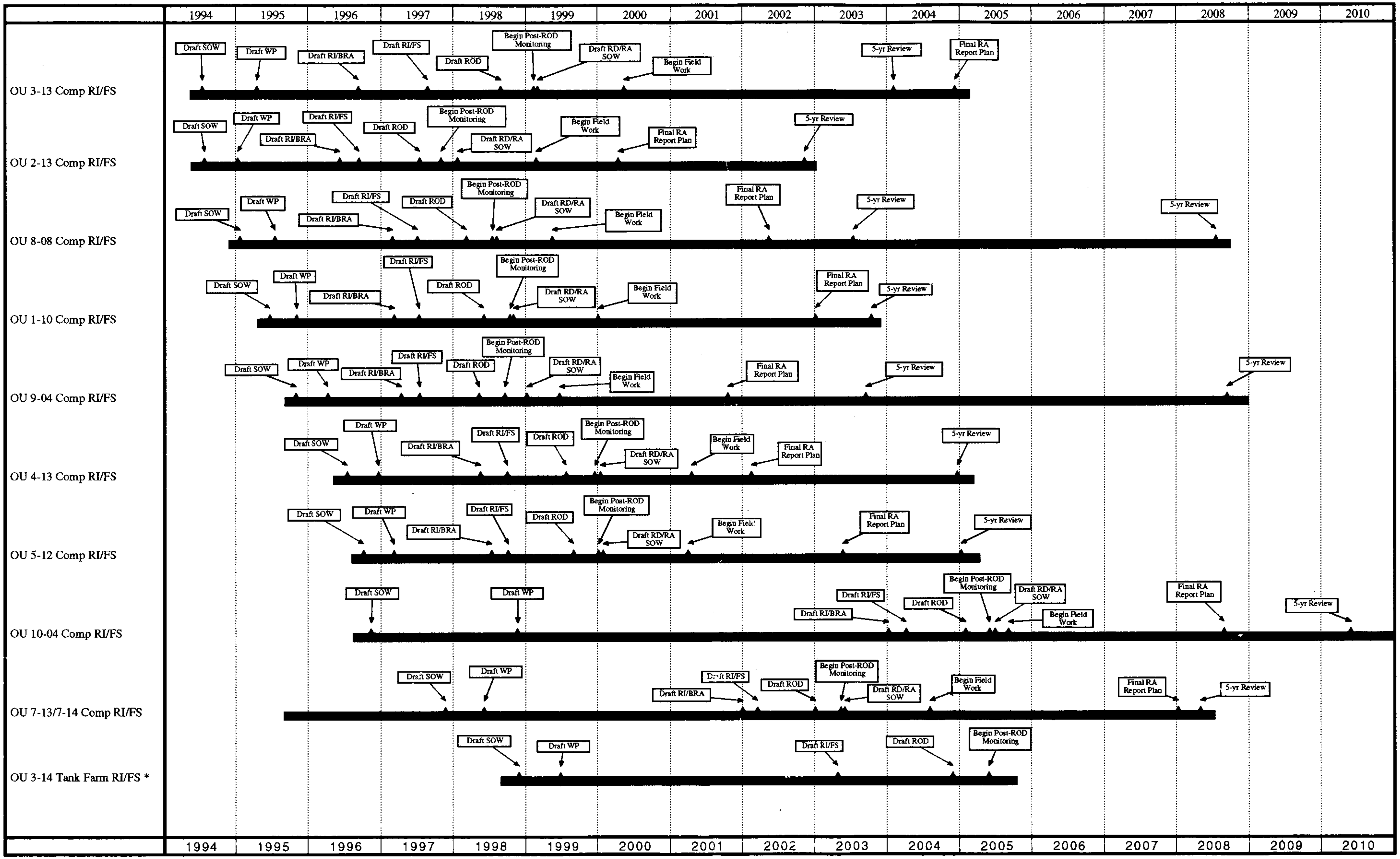
Figure 6.2 Working schedule for the OU 10-08 RI/FS.

Table 6-1. Proposed OU 10-04 comprehensive RI/FS enforceable milestones.

Work Schedule	Date
OU 10-04 Draft RI/FS SOW submitted by DOE-ID to EPA/IDHW for review and comment	November 13, 1996
OU 10-04 Draft RI/FS Work Plan submitted by DOE-ID to EPA and IDHW for review and comment	November 30, 1998
OU 10-04 Draft RI/FS report submitted by DOE-ID to EPA and IDHW for review and comment	June 1, 2001
OU 10-04 Draft RI/FS ROD submitted by DOE-ID to EPA and IDHW for review and comment	April 1, 2002

Table 6-2. Proposed OU 10-08 comprehensive RI/FS enforceable milestones.

Work Schedule	Date
OU 10-08 Draft RI/FS SOW submitted by DOE-ID to EPA/IDHW for review and comment	November 13, 1996
OU 10-08 Draft RI/FS Work Plan submitted by DOE-ID to EPA and IDHW for review and comment	April 1, 2002
OU 10-08 Draft RI/FS report submitted by DOE-ID to EPA and IDHW for review and comment	January 2, 2004
OU 10-08 Draft RI/FS ROD submitted by DOE-ID to EPA and IDHW for review and comment	October 29, 2004



This is the proposed enforceable schedules as of 10/28/98, but has not been finalized with EPA and IDHW.

Figure 6-3. INEEL Comprehensive RI/FS Working Schedules to EPA, IDHW and OU 10-04A and OU 10-04B proposed working schedules (calendar year).

6.1 References

DOE, 1997, *Scope of Work for Operable Unit (OU) 10-04 Waste Area Group 6 and 10 (WAG-6 and WAG-10) Comprehensive Remedial Investigation Feasibility Study (RI/FS)*, DOE/ID-10553, U.S. Department of Energy, Idaho Operations Office.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, U.S. Department of Energy, Idaho Field Office, U.S. Environmental Protection Agency Region 10, State of Idaho Department of Health and Welfare, 1088-06-29-120.

INEL, 1996a, *Operable Unit (OU) 10-04 Groundwater (GW) Strategy Technical Memorandum*, INEL-96/0082, Revision 0, Idaho National Engineering Laboratory.

INEL, 1996b, *Approach and Data Gap Identification for OU 10-04 INEL-Wide Ecological Risk Assessment Technical Memorandum*, INEL-96/0145, Idaho National Engineering Laboratory.

7. PROJECT MANAGEMENT PLAN

This section describes the elements of project management for the WAGs 6 and 10 RI/FS as follows:

- Key positions and responsibilities
- Organization
- Change control
- Work performance
- Communications.

7.1 Key Positions and Responsibilities

7.1.1 Senior Project Manager

The senior project manager (DOE contractor) is responsible for work planning, authorization and performance, analysis, reporting, baseline change control, and for day-to-day communication with DOE-ID. These responsibilities include the following tasks.

- Preparing, issuing, reviewing, approving, and maintaining cost accounts that define work scope, scheduled milestones, and budget that comply with the management control system
- Distributing funds to project managers and work performers for authorized work
- Preparing baseline documents and implementing the management control system, including preparation of a project work breakdown structure and development of control account authorization documents
- Evaluating project performance against the baseline control account plan, presenting variance analysis and corrective action plans, and preparing monthly reports to DOE-ID
- Implementing corrective actions through preparing and approving change documents, as required
- Managing subcontracted work
- Guiding the project manager and contributing individuals.

7.1.2 Project Manager

The project manager, also referred to as the work package manager, is responsible to the senior project manager for the detailed planning and performance of work within any assigned work package. The work package manager is also responsible for the technical quality of the work performed. The project manager is responsible for the following tasks:

- Negotiating with the senior project manager about project scope, schedule, and budget
- Managing scope, schedule, and budget for work performed by organizations within LMITCO
- Supporting the senior project manager in integrating schedules and resources into assigned control accounts
- Reporting project status monthly and weekly
- Maintaining proper change and revision control of assigned control account
- Implementing corrective actions, when required.

If a senior project manager has not been identified, the project manager assumes the duties of the senior project manager. When the project is too small to warrant a senior project manager, the project manager assumes those duties. When the project is too small to warrant a control account manager, the project manager assumes those duties.

7.1.3 Control Account Manager

The control account manager is responsible to the summary account manager for the detailed planning and performance of work within an assigned control account. The control account manager also is responsible for the technical quality of the work. The control account manager is responsible for the following tasks:

- Negotiating with the summary account manager until agreement is reached on scope, schedule, and budget
- Developing control account plans by defining work packages in accordance with the scope, schedule, and budget provided on the cost account authorization
- Ensuring that control account plans are developed in compliance with the management control system
- Defining, planning, scheduling, and negotiating supporting work from performing organizations
- Supporting the summary account manager in integrating schedules and resources in assigned cost accounts with other cost account managers
- Providing monthly progress status on the control account plan
- Ensuring performance of the work planned on the control account plans
- Controlling changes and revisions
- Implementing corrective necessary actions, when required.

7.2 Organization

This section provides an overview of project planning, budgeting, and project baselines.

7.2.1 Planning and Budgeting Overview

Planning and budgeting are the processes by which control accounts are developed, reviewed, approved, and authorized. The sum of the approved control account plans becomes the time-phased performance measurement baseline, which is the formal plan against which progress is evaluated. This section describes the parameters for project work, including the project master schedule and the work breakdown structure. From these documents, the control account and its associated schedule, budget, and SOW are defined.

The planning process requires the full SOW to be planned and scheduled. Once scope is established, resources are applied and fully planned work and applied resources are compared to the available budget. If the available budget is insufficient for the planned work, either the budget will be increased or the scope will be decreased.

A control account authorization is prepared using the project master schedule and the work breakdown structure as guidance. The control account authorization specifies the boundaries of each control account and is used by the senior project manager for planning the work package details. The control account plans and control account authorization are reviewed and approved by the DOE-ID counterpart, the senior project manager, and other appropriate management. Approval of the control account authorization and control account plan constitutes authority to perform work.

7.2.2 Project Baselines

The project baselines, used for evaluating project performance, are established in the project master schedule and work breakdown structure, and are further defined in the control account authorization and cost plan. The various baselines are defined as follows:

- The budget baseline for the project is the sum of the approved budgets on the control account authorizations plus undistributed budget, which are maintained through the change control system.

- The schedule baseline consists of the key decision points and major milestones displayed on the project master schedule. Key decision points and major milestones are shown in the control accounts that directly support the milestones. Key milestones are defined by either DOE headquarters or DOE-ID, and major milestones are defined by LMITCO.

- The scope of baseline, or technical baseline, is defined in the work breakdown structure and detailed in the total control account authorizations. It is expanded further in the design media, operating specifications, and process flow sheets.

- The funds baseline is contained in the annual approved funding program plan. The budget authority is a ceiling for costs plus commitments, and the budget outlay is a ceiling for expenditures only during each fiscal year.

7.3 Change Control

Waste Area Groups 6 and 10 will use the change control process to manage and control changes to the performance measurement baseline, the schedule baseline, and the SOW. The change control process applies to all major projects and major system acquisitions and will be implemented according to the latest revision of MCP-20, "Change Management."

7.4 Work Performance

The work performance measurement process consists of retrieving planning, performance, and cost data, and providing the data to various management levels for timely decision-making corrective action. The data are used to calculate cost, schedule, and completion variances. Written variance analyses are required on an exception basis (e.g., when variances exceed predetermined thresholds) to identify causes of significant deviations from plans and to identify and implement appropriate corrective actions. The cost and schedule generated at the cost account level are summarized through both the work breakdown structure and the organization structure to provide information concerning each manager's area of responsibility. This information is analyzed by the appropriate manager and then is summarized in written reports that document costs, schedule, and technical performance.

7.4.1 Work Performance Measurement

7.4.1.1 **Senior Project Manager.** The senior project manager is responsible for accomplishing the work described in the control account plan.

7.4.1.2 **Management Control System Elements.** Five key data elements within the management control systems are used to calculate variances that give the senior project manager an indication of the progress toward the goals and objectives stated on the cost account plan. The various performance measurements are defined as follows:

- *Budgeted Cost for Work Scheduled*—The planned value for work in a control account plan that is scheduled in a given time period.

- *Budgeted Cost for Work Performed*—The value of work actually completed during the measurement period. It is equal to the planned value for the work that was finished.

- *Actual Cost of Work Scheduled*—The actual accrued costs incurred within a given time period, including labor and material, and the associated indirect costs.

- *Budget at Completion*—The total budget authorized for a cost control account.

- *Estimated Cost at Completion*—An estimate of the sum that is the actual costs to date plus a forecast of the costs to complete the remainder of the work.

The status of the control account is determined monthly using the data elements discussed above.

7.5 Communications

The two types of reports explained in this subsection will be prepared for this project: (1) routine and (2) event reports. Each of these is discussed below.

7.5.1 Routine Reports

Weekly and monthly reports will be issued to the DOE-ID project manager. Reports will contain a summary of work in progress, planned work, problems encountered, results of any change control board or internal change board actions, work stoppages, anticipated schedule variances, work completed, key position changes, status of subcontracts, corrective action plans, audits performed, and earned value reports.

7.5.2 Event Reports

Unusual events may be within the scope of DOE Order 232.1. If such events occur, notifications will comply with this order. Unusual events outside the scope of DOE Order 232.1 will be reported as follows:

- Minor problems will be reported to the site supervisor and, if necessary, to the safety representative.
- Radiological health and safety problems that cannot be corrected onsite will be reported to the site supervisor or the health and safety officer.
- Problems that could stop work for a period of more than one shift, cause a schedule change greater than 2 days, or cause a budget change greater than $100,000 will be reported to the senior project manager. The senior project manager will report these problems to appropriate cost account, project, or program managers.